U.S. Department of the Interior
Bureau of Land Management

Willow Master Development Plan

Environmental Impact Statement

SUPPLEMENT TO THE DRAFT

Volume 2: Appendix A

March 2020

Prepared by:
U.S. Department of the Interior
Bureau of Land Management

In Cooperation with:
U.S. Army Corps of Engineers
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
U.S. Department of Transportation
Native Village of Nuiqsut
Iñupiat Community of the Arctic Slope
City of Nuiqsut
North Slope Borough
State of Alaska

Estimated Total Costs Associated with Developing and Producing this EIS:
$5,005,000

Willow Master Development Plan

Supplement to the Draft Environmental Impact Statement

Appendix A
Figures

March 2020

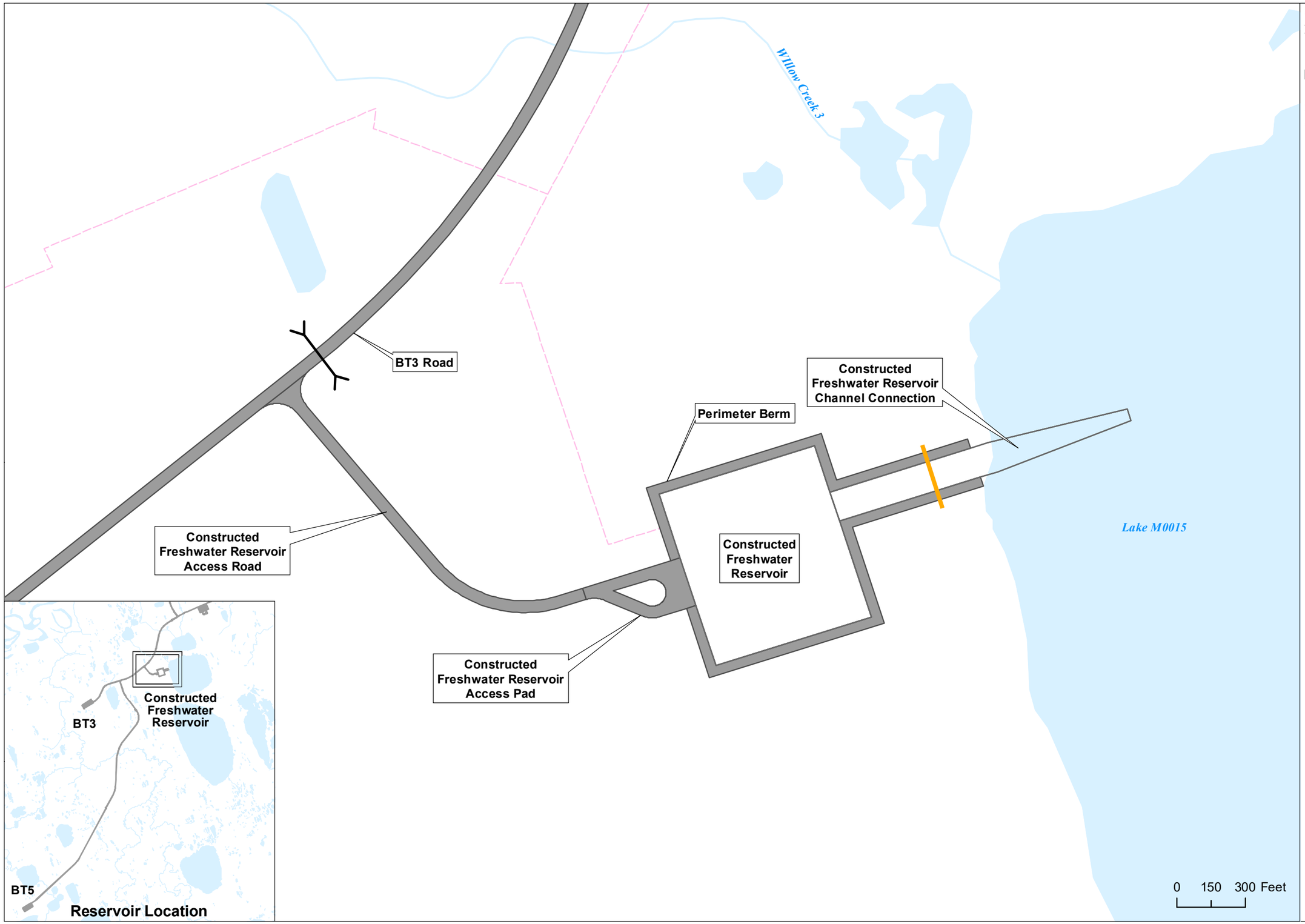
Estimated Total Costs Associated with Developing and Producing this EIS: $5,005,000
The dollar figure represented here is an approximate cost to date. Previously published costs were estimates for the full EIS process.

This page intentionally left blank.

List of Figures

Figure 2.2.1 Constructed Freshwater Reservoir 1
Figure 2.2.2 Boat Ramps 2
Figure 2.3.1 Option 3: Colville River Crossing 3
Figure 2.3.2 Option 3 Curve Widening 4
Figure 3.1.1 Past and Present Actions from Teshekpuk Lake to Kuparuk 5
Figure 3.4.1 Analysis Area for Soils, Permafrost, and Gravel Resources 6
Figure 3.5.1 Known Contaminated Sites or Spills within 0.5 mile of the Project 7
Figure 3.6.1 Analysis Area for Noise 8
Figure 3.7.1 Visual Resources Analysis Area, Project Viewshed, and Proposed Project Facilities 9
Figure 3.8.1 Watersheds in the Analysis Area for Water Resources 10
Figure 3.8.2. Water Resources in and near the Analysis Area 11
Figure 3.9.1 Analysis Area for Wetlands and Vegetation 12
Figure 3.9.2 Wetlands in the Analysis Area 13
Figure 3.9.3 Land Cover Classes in the Analysis Area 14
Figure 3.10.1 Analysis Area for Fish 15
Figure 3.10.2 Fish Habitat in the Willow Area 16
Figure 3.11.1 Bird Habitat Use and Analysis Area 17
Figure 3.11.2 Spectacled Eider Pre-Breeding Density in the Analysis Area 18
Figure 3.11.3 Yellow-Billed Loon Density and Nests in the Analysis Area 19
Figure 3.11.4 Yellow-Billed Loon Density and Nests in the Willow Area 20
Figure 3.12.1 Analysis Area for Terrestrial Mammals 21
Figure 3.12.2 Annual Ranges of the Central Arctic and Teshekpuk Caribou Herds 22
Figure 3.12.3 Seasonal Distribution of Female Caribou in the Central Arctic Caribou Herd 23
Figure 3.12.4 Seasonal Distribution of Female Caribou in the Teshekpuk Caribou Herd 24
Figure 3.12.5 Movement of GPS-Collared Caribou of the Teshekpuk Caribou Herd 2004–2018 25
Figure 3.12.6 Distribution of Calving Caribou of the Teshekpuk Caribou Herd 1990–2018 26
Figure 3.12.7 Mean Caribou Density by Season 2001–2018 27
Figure 3.13.1 Polar Bear Dens, Critical Habitat, and Potential Terrestrial Denning Habitat 28
Figure 3.13.2 Polar Bear Dens, Critical Habitat, and Potential Terrestrial Denning Habitat in the Eastern Analysis Area 29
Figure 3.13.3 Polar Bear Potential Terrestrial Denning Habitat in the Willow Area 30
Figure 3.14.1 Map of Surface Land Ownership in the Analysis Area 31
Figure 3.16.1 All Resource Subsistence Use Areas by Module Delivery Option 3, Nuiqsut, 1995–2006 32
Figure 3.16.2 Caribou Subsistence Use Areas by Module Delivery Option 3 Nuiqsut, 1995–2006 33
Figure 3.16.3 Caribou Subsistence Use Areas by Module Delivery Option 3, Nuiqsut, 2008–2016 34
Figure 3.16.4 Wolf and Wolverine Subsistence Use Areas by Module Delivery Option 3, Nuiqsut, 1995–2006 35
Figure 3.16.5 Goose Subsistence Use Areas by Module Delivery Option 3, Nuiqsut, 1995–2006 36
Figure 3.16.6 Seal Subsistence Use Areas by Module Delivery Option 3, Nuiqsut, 1995–2006 37
Figure 3.16.7 Eider Subsistence Use Areas by Module Delivery Option 3, Nuiqsut, 1995–2006 38
Figure 3.16.8 Fish Subsistence Use Areas by Module Delivery Option 3, Nuiqsut, 1995–2006 39
Figure 3.16.9 Moose Subsistence Use Areas by Module Delivery Option 3, Nuiqsut, 1995–2006 40
Figure 3.16.10 All Resource Subsistence Use Areas by Module Delivery Option 3, Utqiaġvik, 1997–2006 41
Figure 3.16.11 Caribou Subsistence Use Areas by Module Delivery Option 3, Utqiaġvik, 1997–2006 42
Figure 3.16.12 Wolf and Wolverine Subsistence Use Areas by Module Delivery Option 3, Utqiaġvik, 1997–2006 43
Figure 3.16.13 Moose Subsistence Use Areas by Module Delivery Option 3, Utqiaġvik, 1997–2006 44
Figure 3.19.1 Reasonably Foreseeable Future Actions that may Interact with the Willow Project 45

This page intentionally left blank.



Willow Proposed Development Features

- Culvert Battery
- Weir
- New Pipeline New VSM
- Gravel Footprint

Note:
Alternative B is shown as a reference. The freshwater reservoir will be the same for all alternatives.

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 2.2.1

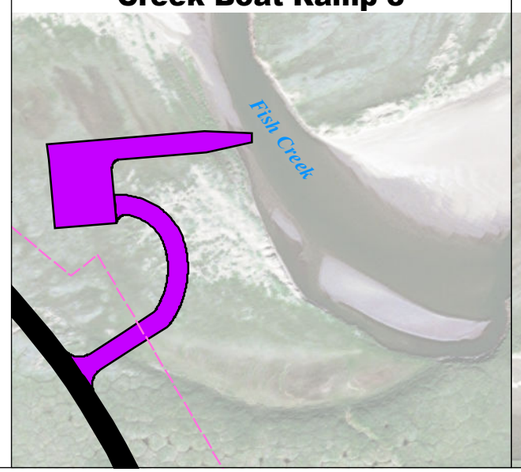
Kalikpik River
BT4
Boat Ramp 3
Alt B Only
BT2
Fish (Uvlutuaq) Creek
Judy (Iqalliqpik) Creek
BT1
Boat Ramp 2
Alt B Only
Judy (Kayyaaq) Creek
Judy (Iqalliqpik) Creek
Lake
M0015
BT3
Lake
R0064
BT5
Boat Ramp 1
Alt B, C, and D
CD5
CD2
CD1
CD4N
GMT-1
GMT-2
Gravel Mine
Site
Ublutuoch (Tiŋmiaqsiġvik) River
NUIQSUT
ASRC
Gravel
Mine
Site
Colville River
0
2.5
5 Miles

Willow Proposed Development Features
- Culvert Battery
- Bridge
- New Pipeline Existing VSM
- New Pipeline New VSM
- Ice Road
- Drill Site
- Gravel Footprint
- Boat Ramp

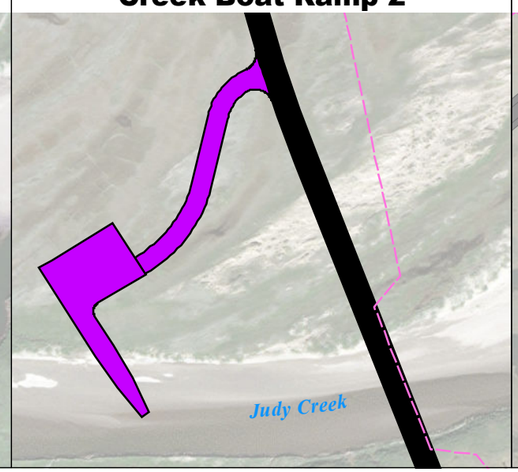
Other Infrastructure
- Existing Road
- Existing Pipeline
- Existing Infrastructure

Land Designation
- National Petroleum Reserve in Alaska

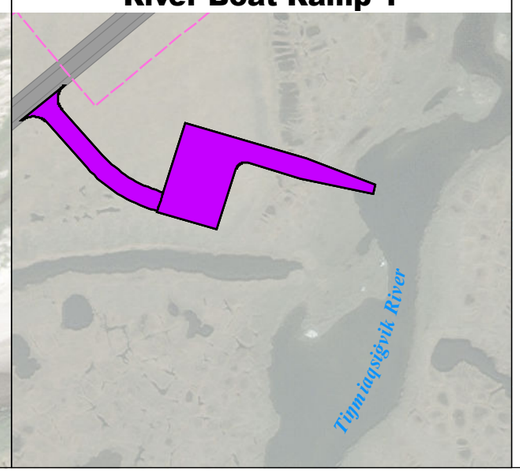
Conceptual Fish Creek Boat Ramp 3



Conceptual Judy Creek Boat Ramp 2

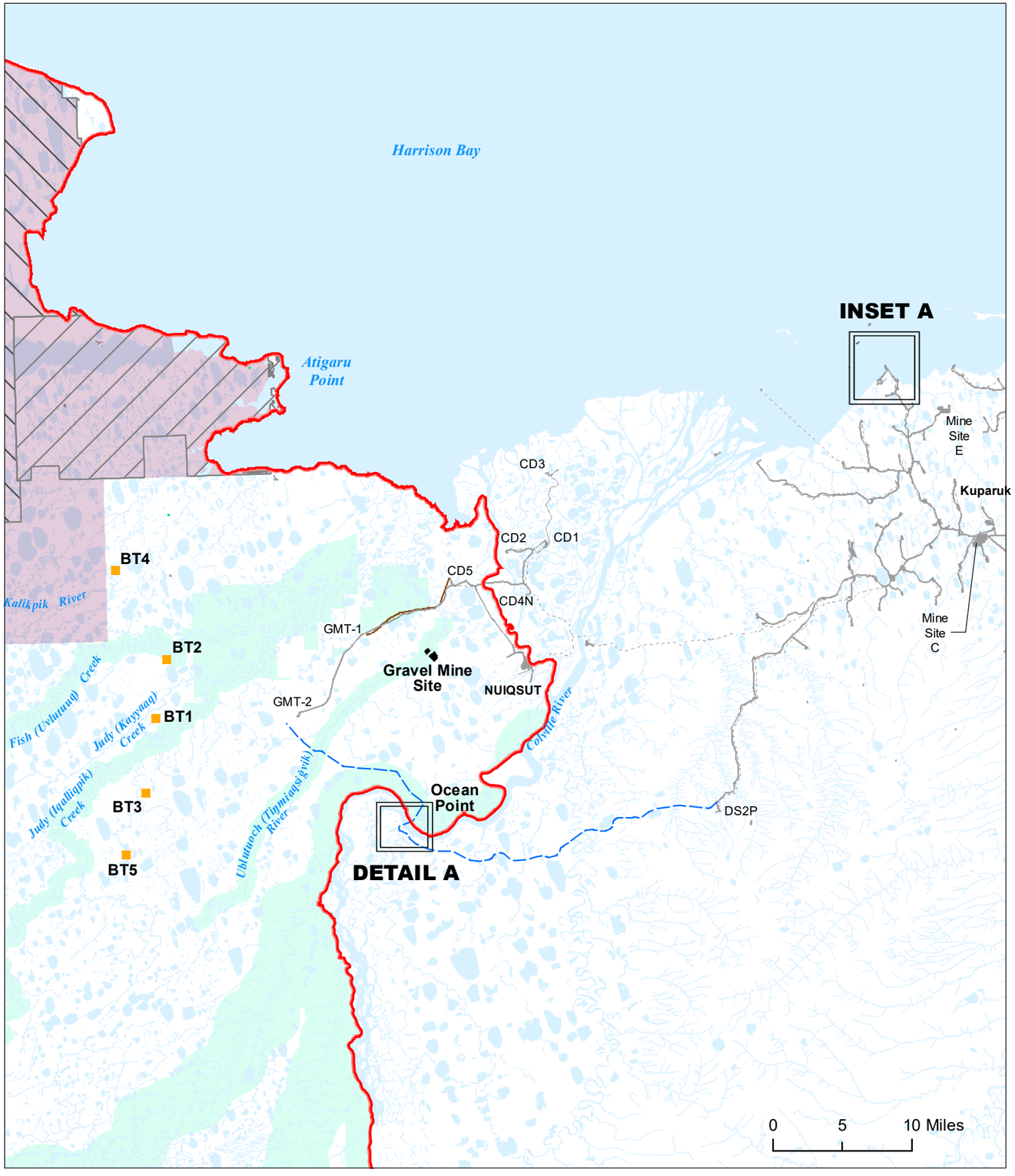


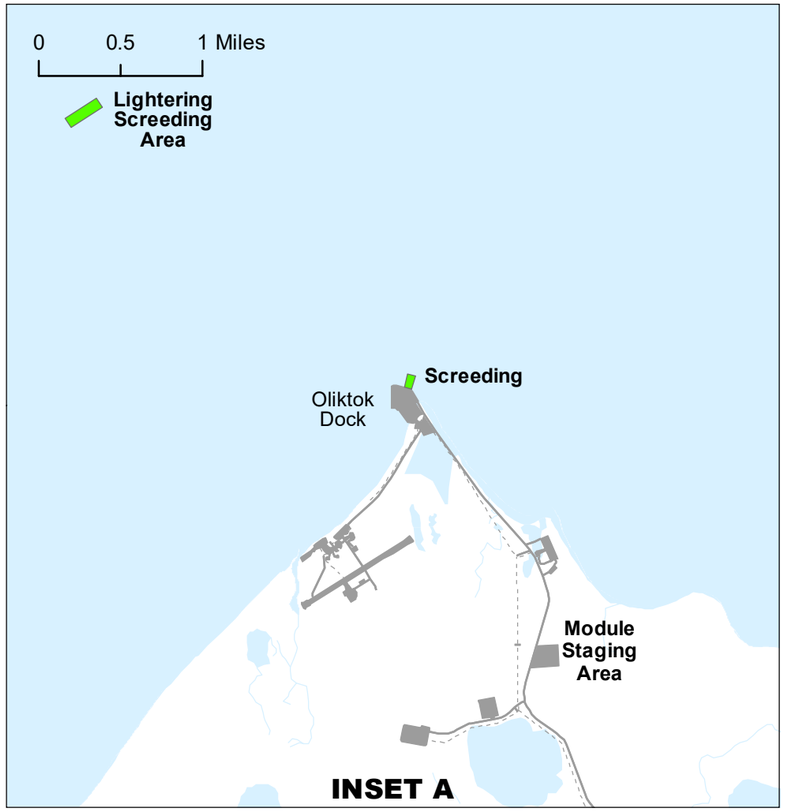
Conceptual Tiŋmiaqsiġvik River Boat Ramp 1

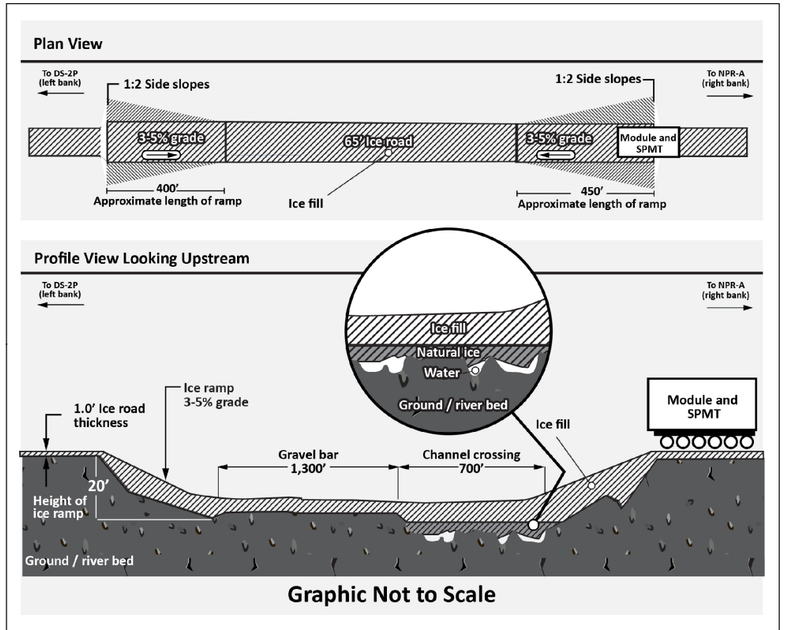


No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 2.2.2







DETAIL A - Colville River Ice Bridge

Willow Proposed Development Features

- Drill Site (Not to Scale)
- Gravel Mine Site
- Screeding

Other Infrastructure

- Existing Road
- Existing Pipeline
- Existing Infrastructure

Land Designation

- National Petroleum Reserve in Alaska

Best Management Practice Areas

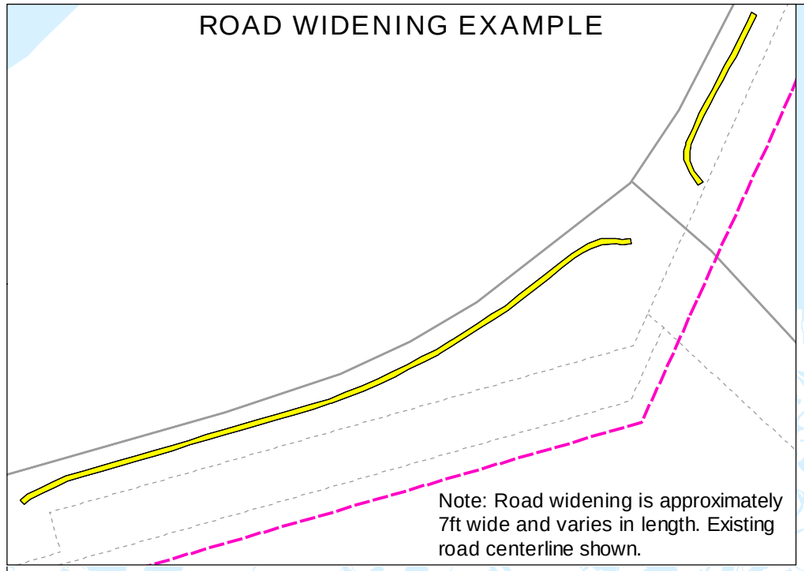
- K-1 River Buffers
- K-5 Teshekpuk Lake Caribou Habitat Area

Oil & Gas

- Unavailable to Leasing
- Unavailable no Leasing and no new non-subsistence infrastructure

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 2.3.1



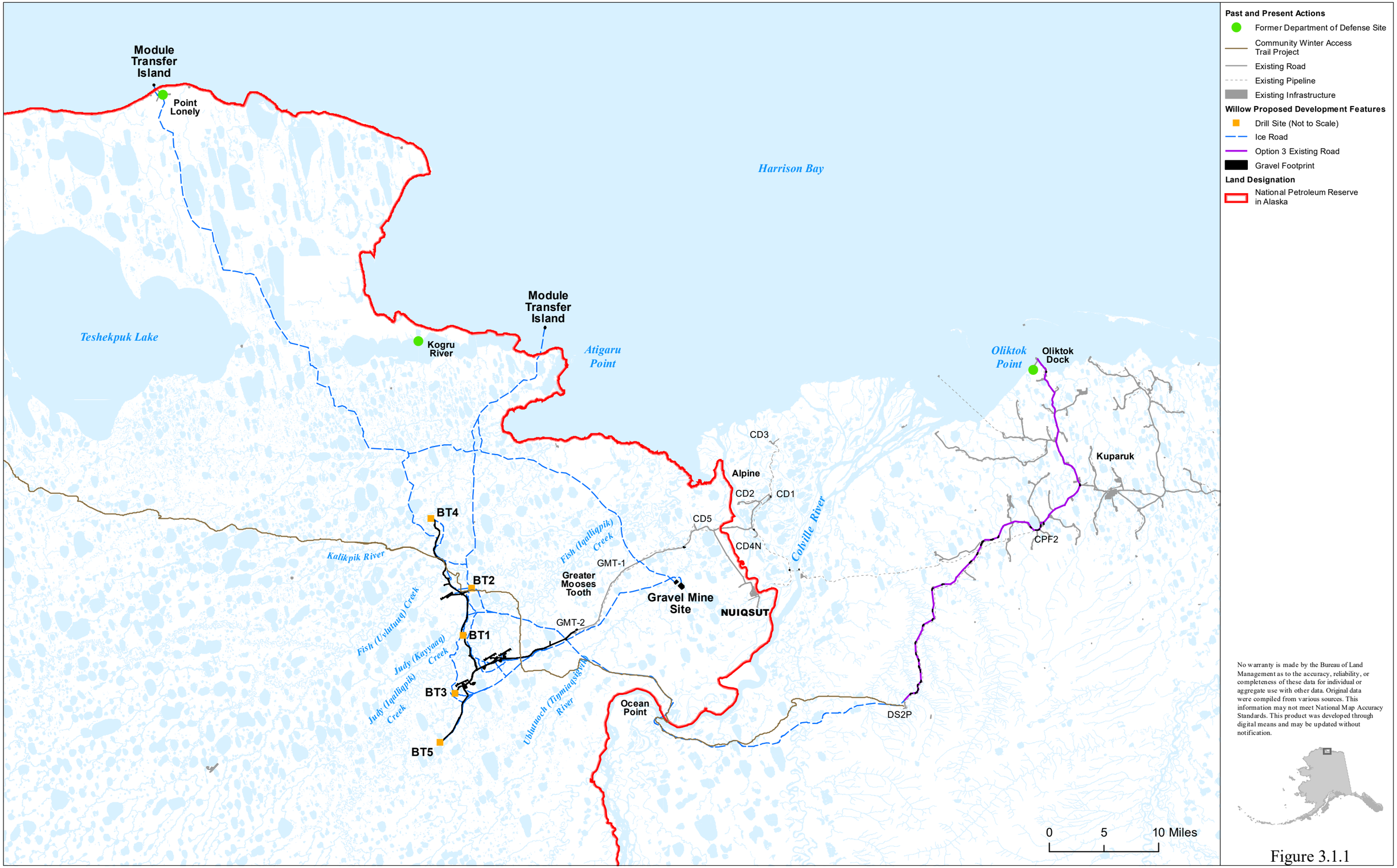
Oliktok Dock
Mine Site E
Kuparuk
Mine Site C
CPF2
DS2M
DS2P
CD3
CD1
CD2
CD4N
CD5
GMT-1
GMT-2
Gravel Mine Site
NUIQSUT
ASRC Gravel Mine Site
Judy (Iqalliqpik) Creek
Ublutuoch (Tiŋmiaqsigvik) River
Colville River

0 2.5 5 Miles

Willow Proposed Development Features
- Option 3 Road Widening Locations
- New Pipeline Existing VSM
- New Pipeline New VSM
- Option 3 Ice Road
- Option 3 Road Widening

Other Infrastructure
- Existing Road
- Existing Pipeline
- Existing Infrastructure

Figure 2.3.2



No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.1.1

Module Transfer Island
Point Lonely
Harrison Bay
Teshekpuk Lake
Module Transfer Island
Atigaru Point
Oliktok Point
Oliktok Dock
Mine Site E
CD3
Kuparuk
CD2
CD1
BT4
CD5
Kalikpik River
Colville River
CD4N
GMT-1
Mine Site C
BT2
INSET A
NUIQSUT
Horizontal Directional Drilling Pads
Fish (Uvlutuuq) Creek
GMT-2
Judy (Kayyaaq) Creek
BT1
Judy (Laalliqpik) Creek
BT3
Ublutuoch (Tiŋmiaqsigvik) River
BT5
DS2P
0 5 10 Miles

Willow Proposed Development Features
- Drill Site (Not to Scale)
- Ice Road
- Option 3 Existing Road
- Gravel Footprint

Other Infrastructure
- Existing Road
- Existing Pipeline
- Existing Infrastructure

Land Designation
- National Petroleum Reserve in Alaska

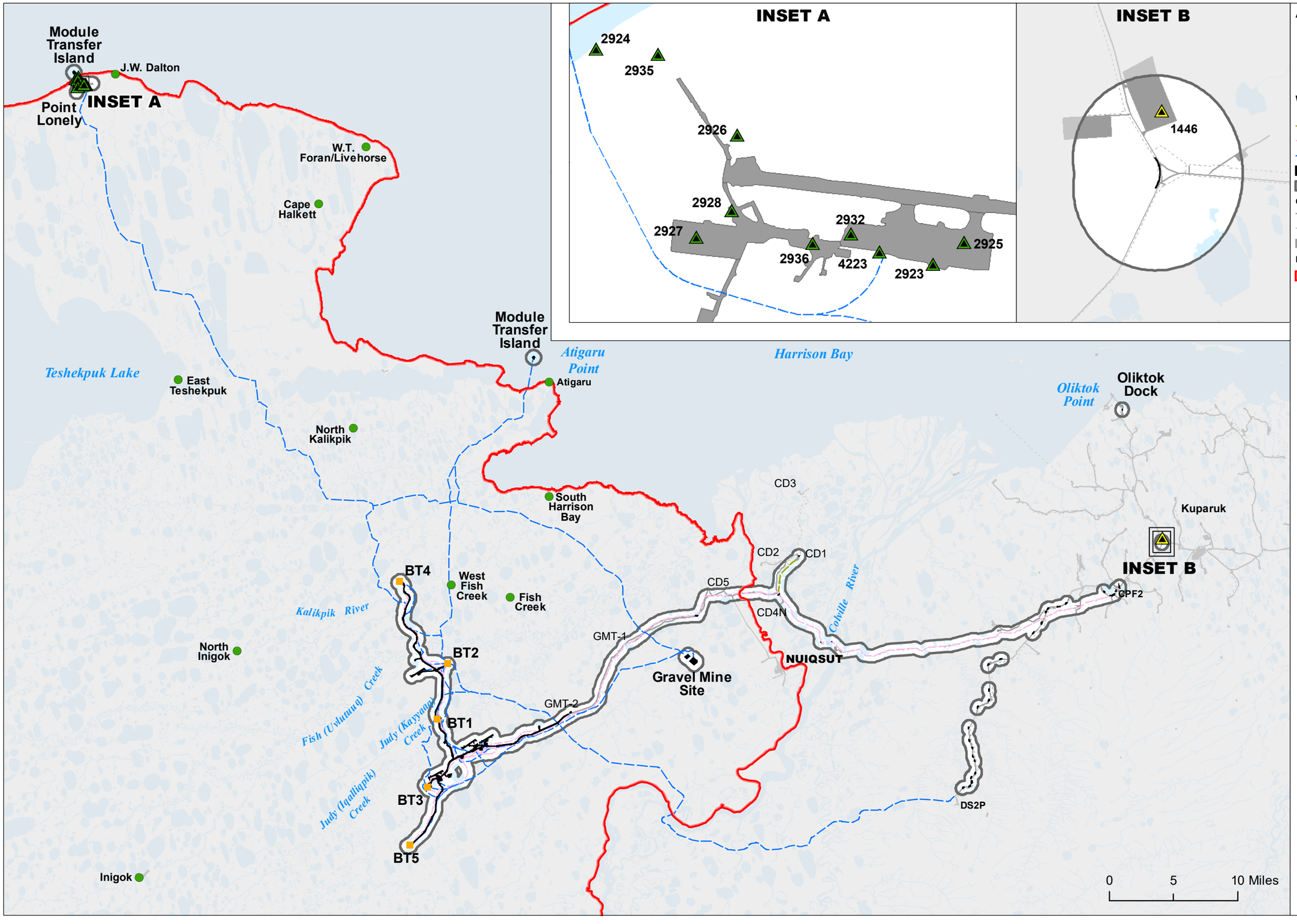
Note:
The analysis area is the area within 328 feet (100 meters) of proposed ground disturbances and ice infrastructure.

INSET A

Gravel Mine Site
Ublutuoch (Tiŋmiaqsigvik) River
Bill's Creek

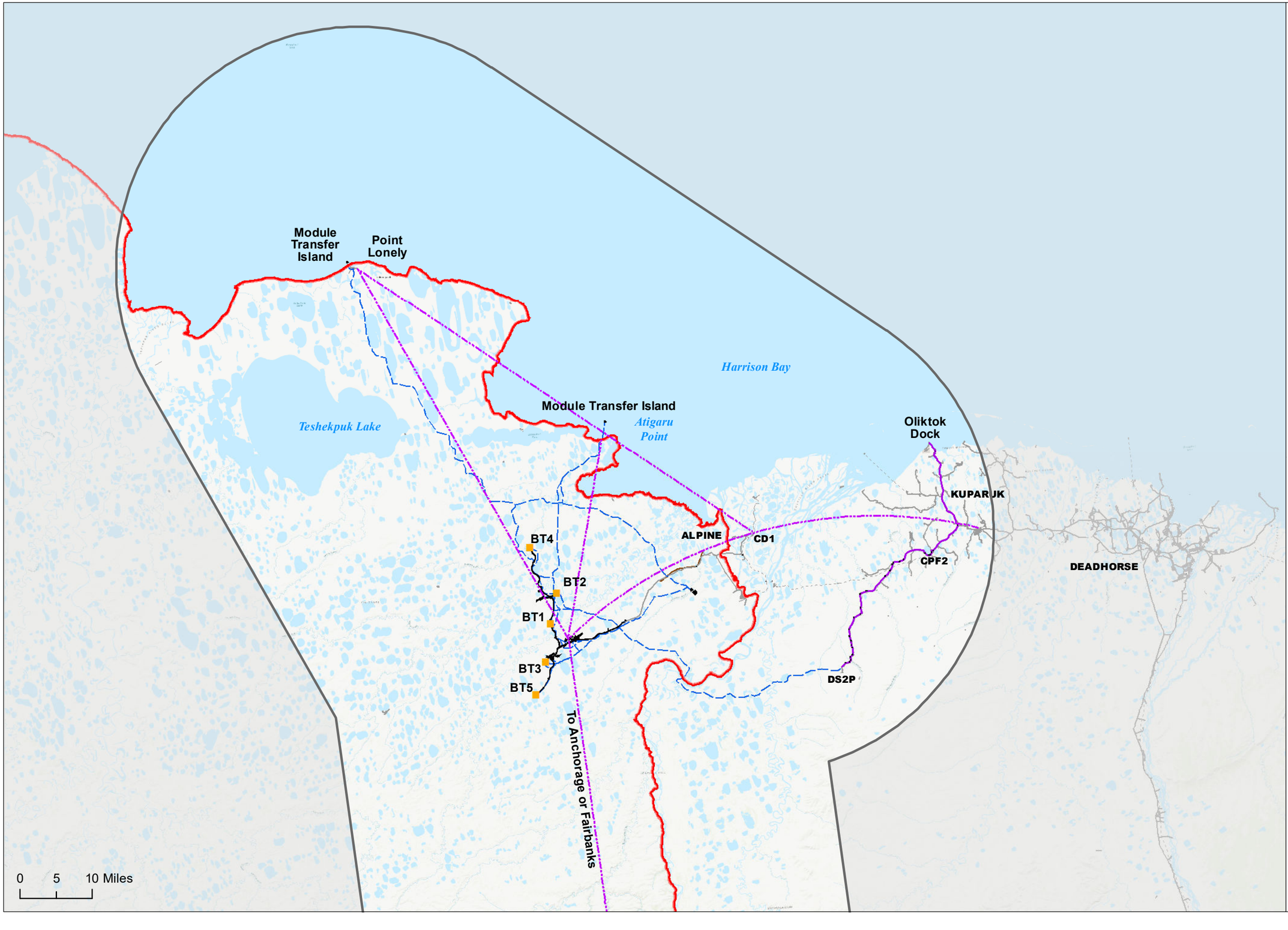
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.4.1



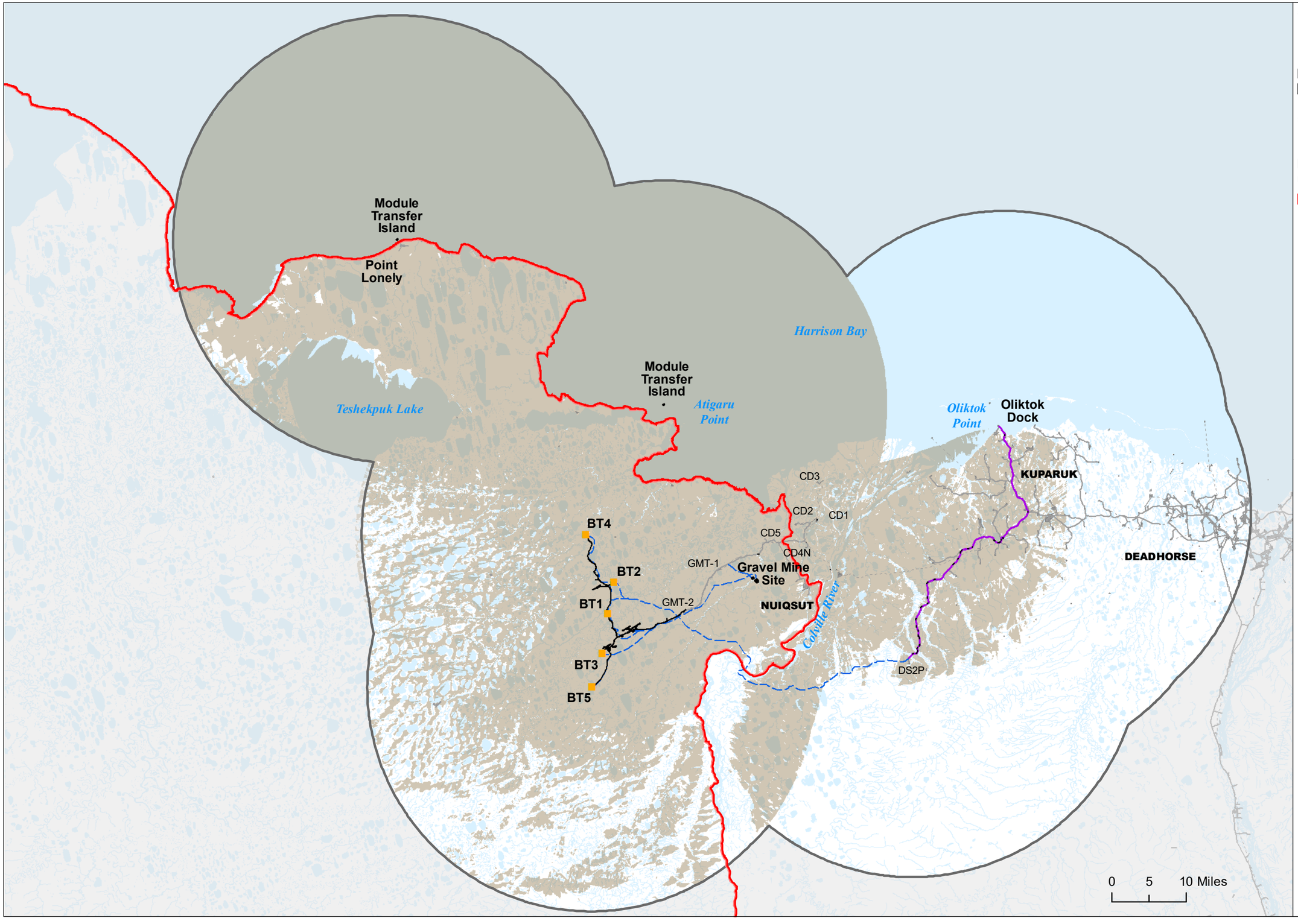
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.5.1



No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.6.1



Willow Proposed Development Features
- Drill Site (Not to Scale)
- Ice Road
- Option 3 Existing Road
- Gravel Footprint
- Analysis Area
- Project Viewshed

Other Infrastructure
- Existing Road
- Existing Pipeline
- Existing Infrastructure

Land Designation
- National Petroleum Reserve in Alaska

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.7.1

Module Transfer Island
Point Lonely
Harrison Bay
Teshekpuk Lake
Module Transfer Island
Atigaru Point
Oliktok Point
Oliktok Dock
Kuparuk
CD3
CD1
CD2
CD5
CD4N
Colville River
Deadhorse
BT4
Kalikpik River
Fish (Iqalliqpik) Creek
GMT-1
BT2
Fish (Uvlutuuq) Creek
INSET A NUIQSUT
Horizontal Directional Drilling Pads
GMT-2
BT1
Judy (Kayyaaq) Creek
Judy (Iqalliqpik) Creek
BT3
Ublutuoch (Tiŋmiaqsigvik) River
DS2P
BT5
Itkillik River
0 5 10 Miles

Willow Proposed Development Features

Hydrologic Unit 10
- Colville River
- Atigaru Point
- Colville River Delta
- Garry Creek
- Ingaluat Creek-Colville River
- Kachemach River
- Kalikpik River
- Kalubik Creek
- Kogru River
- McLeod Point
- Miluveach River
- Outlet Fish Creek
- Outlet Itkillik River
- Outlet Judy Creek
- Pogik Bay
- Simpson Lagoon
- Smith River
- Teshekpuk Lake
- Ublutuoch River
- Ugnuravik River

Willow Proposed Development Features
- Drill Site (Not to Scale)
- Bridge
- Ice Road
- Option 3 Existing Road
- Gravel Footprint
- Analysis Area

Other Infrastructure
- Existing Road
- Existing Pipeline
- Existing Infrastructure

Land Designation
- National Petroleum Reserve in Alaska

INSET A

Gravel Mine Site
Ublutuoch (Tiŋmiaqsigvik) River
Bill's Creek

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.8.1

Atigaru Point
Oliktok Point
Oliktok Dock
Simpson Lagoon
Kuparuk
Deadhorse
CPF2
Kalubik Creek
Kachemach River
Miluyeach River
Colville River
NUIQSUT
Boat Ramp
Boat Ramp
Boat Ramp
Kalikpik River
Fish (Uvlutuuq) Creek
Judy (Kayyaaq) Creek
Judy (Iqalliqpik) Creek
Ublutuoch (Tinmiaqsiovik) River
Ocean Point
DS2P
CFWR
Itkillik River
Umiat
0 5 10 Miles

Willow Proposed Development Features
- Ice Road
- Option 3 Existing Road
- Gravel Footprint

Other Infrastructure
- Existing Road
- Existing Pipeline
- Existing Infrastructure

Land Designation
- National Petroleum Reserve in Alaska

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.8.2

Module Transfer Island
Point Lonely
Harrison Bay
Teshekpuk Lake
Module Transfer Island
Atigaru Point
Oliktok Point
Oliktok Dock
Kuparuk
CD3
CD2
CD1
CD5
CD4N
BT4
BT2
BT1
BT3
BT5
GMT-1
GMT-2
INSET A NUIQSUT
Horizontal Directional Drilling Pads
CPF2
Deadhorse
DS2P
Kalikpik River
Fish (Uvlutuuq) Creek
Judy (Kayyaaq) Creek
Judy (Iqalliqpik) Creek
Fish (Iqalliqpik) Creek
Ublutuoch (Tiŋmiaqsigvik) River
Colville River
Itkillik River

INSET A
Gravel Mine Site
Ublutuoch (Tiŋmiaqsigvik) River
Bill's Creek

0 5 10 Miles

Willow Proposed Development Features

Hydrologic Unit 10
- Colville River
- Atigaru Point
- Colville River Delta
- Garry Creek
- Ingaluat Creek-Colville River
- Kachemach River
- Kalikpik River
- Kalubik Creek
- Kogru River
- McLeod Point
- Miluveach River
- Outlet Fish Creek
- Outlet Itkillik River
- Outlet Judy Creek
- Pogik Bay
- Simpson Lagoon
- Smith River
- Teshekpuk Lake
- Ublutuoch River
- Ugnuravik River

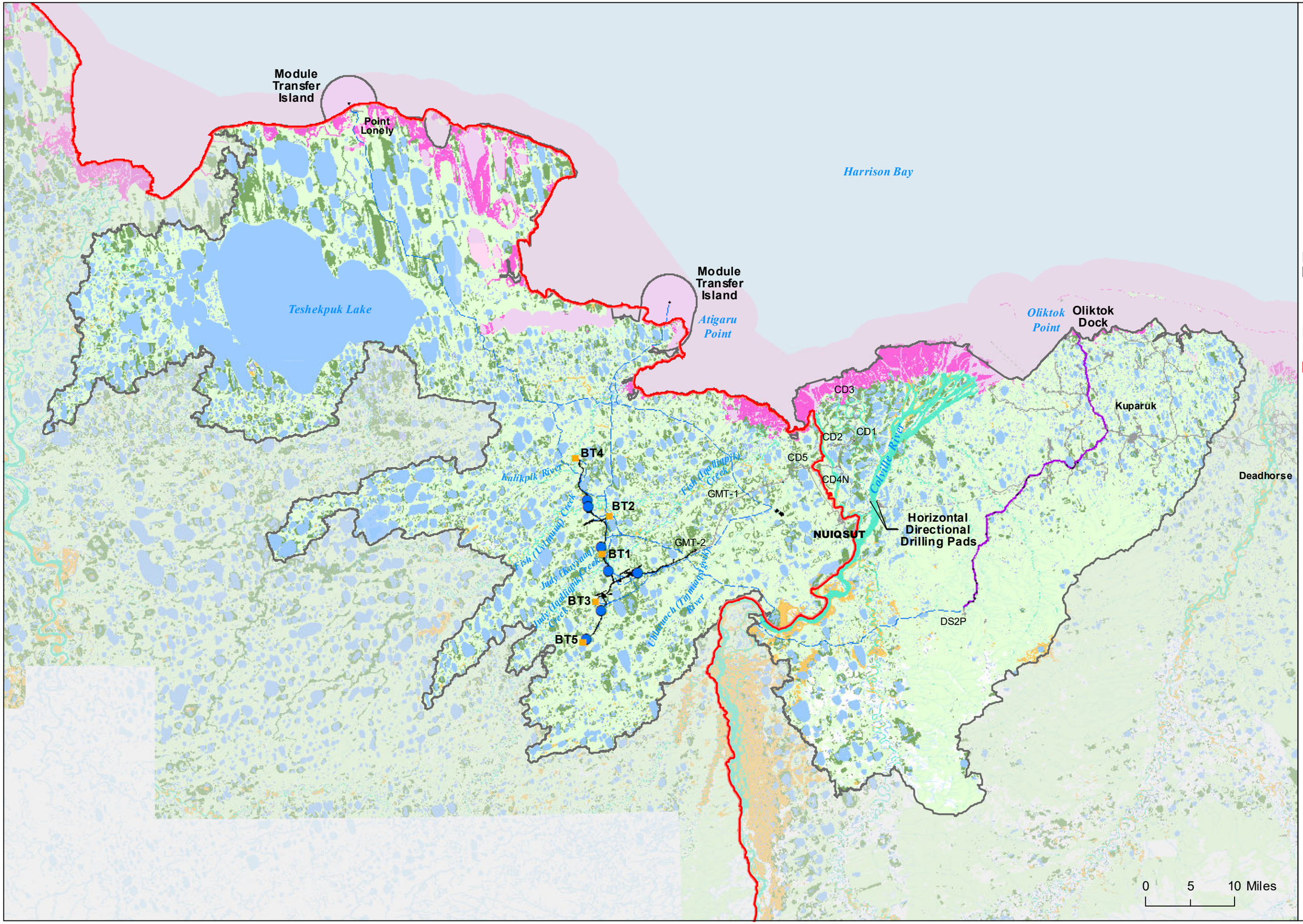
Willow Proposed Development Features
- Drill Site (Not to Scale)
- Bridge
- Ice Road
- Option 3 Existing Road
- Gravel Footprint
- Analysis Area

Other Infrastructure
- Existing Road
- Existing Pipeline
- Existing Infrastructure

Land Designation
- National Petroleum Reserve in Alaska

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.9.1



National Wetlands Inventory

Cowardin Class System and Subsystem

- E1, M1
- E2, M2
- L1, L2
- PEM1, PEM2 - C, F, H Modifiers
- PEM1 - A, B, E Modifiers
- PSS1
- PUB
- PUS
- R2, R3, R5

Willow Proposed Development Features

- Drill Site (Not to Scale)
- Bridge
- Ice Road
- Option 3 Existing Road
- Gravel Footprint
- Analysis Area

Other Infrastructure

- Existing Road
- Existing Pipeline
- Existing Infrastructure

Land Designation

- National Petroleum Reserve in Alaska

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.9.2

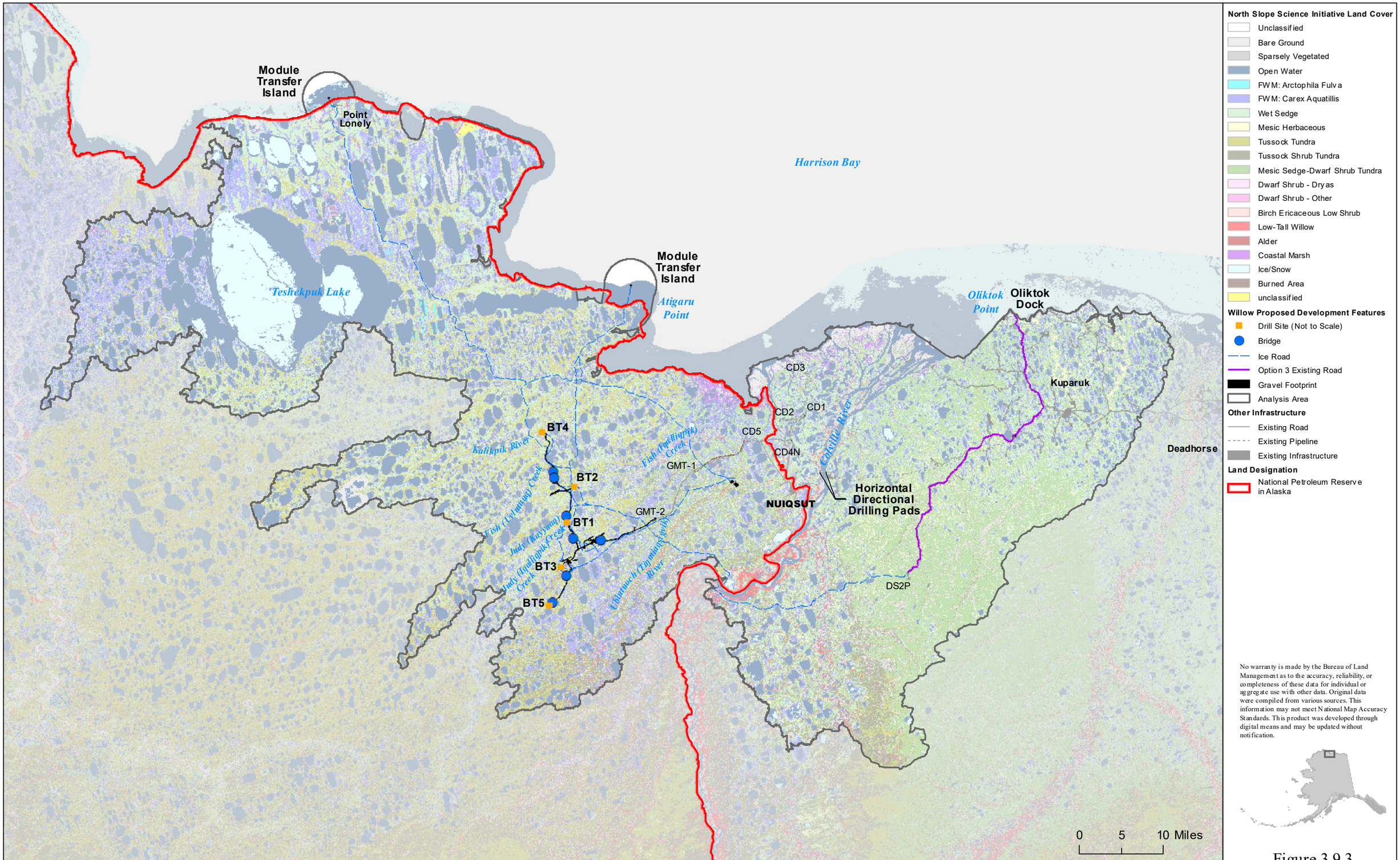
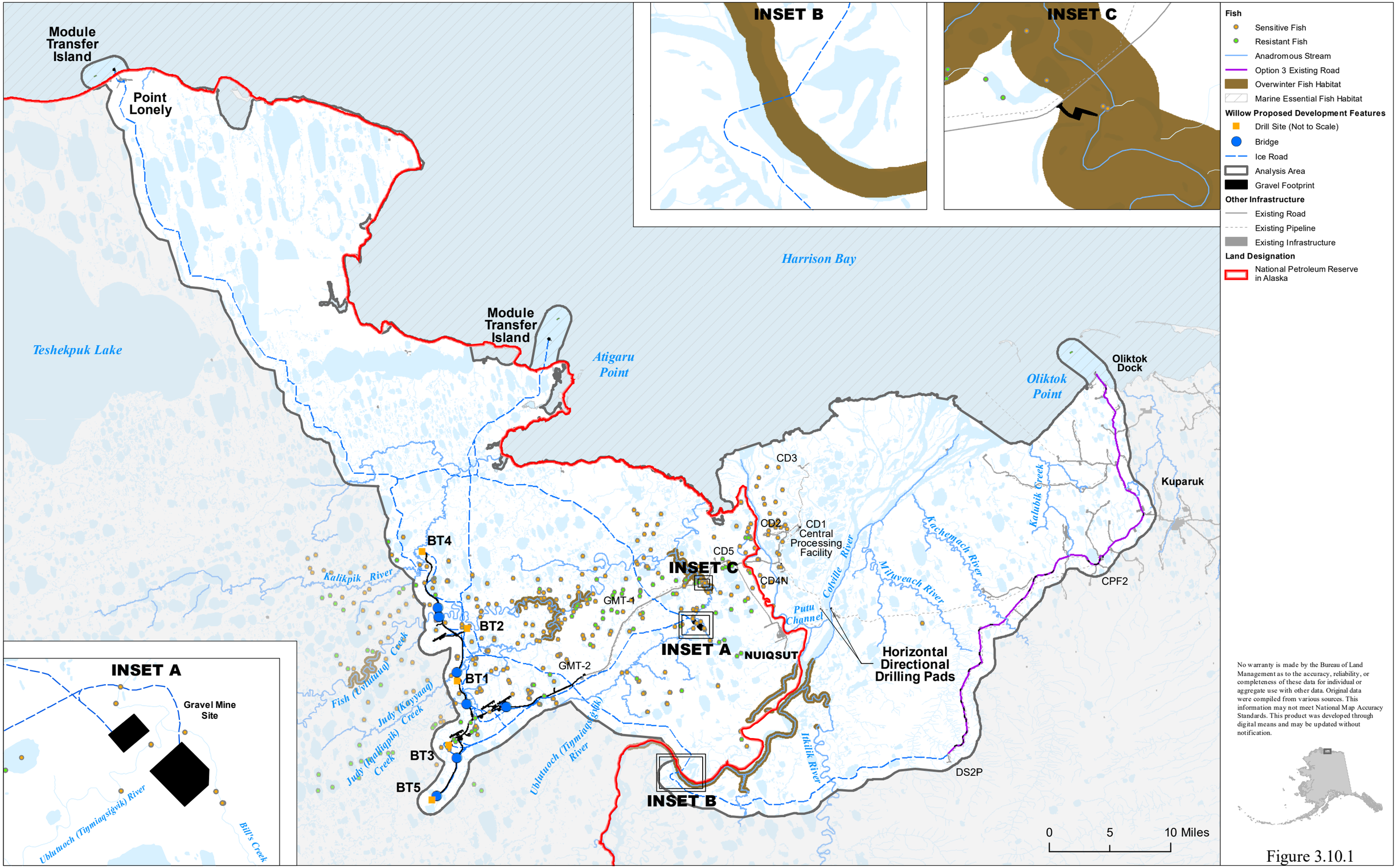

Module Transfer Island
Point Lonely
Harrison Bay
Teshekpuk Lake
Module Transfer Island
Atigaru Point
Oliktok Point
Oliktok Dock
Kuparuk
Deadhorse
CD3
CD2
CD1
CD5
CD4N
Colville River
Horizontal Directional Drilling Pads
NUIQSUT
DS2P
BT4
BT2
BT1
BT3
BT5
GMT-1
GMT-2
Kalikpik River
Fish (Iqalliqpik) Creek
Fish (Uvlutuuq) Creek
Judy (Kayyaaq) Creek
Judy (Iqalliqpik) Creek
Ublutuoch (Tiqmiaqsigvik) River
0 5 10 Miles
North Slope Science Initiative Land Cover
Unclassified
Bare Ground
Sparsely Vegetated
Open Water
FWM: Arctophila Fulva
FWM: Carex Aquatillis
Wet Sedge
Mesic Herbaceous
Tussock Tundra
Tussock Shrub Tundra
Mesic Sedge-Dwarf Shrub Tundra
Dwarf Shrub - Dryas
Dwarf Shrub - Other
Birch Ericaceous Low Shrub
Low-Tall Willow
Alder
Coastal Marsh
Ice/Snow
Burned Area
unclassified
Willow Proposed Development Features
Drill Site (Not to Scale)
Bridge
Ice Road
Option 3 Existing Road
Gravel Footprint
Analysis Area
Other Infrastructure
Existing Road
Existing Pipeline
Existing Infrastructure
Land Designation
National Petroleum Reserve in Alaska
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

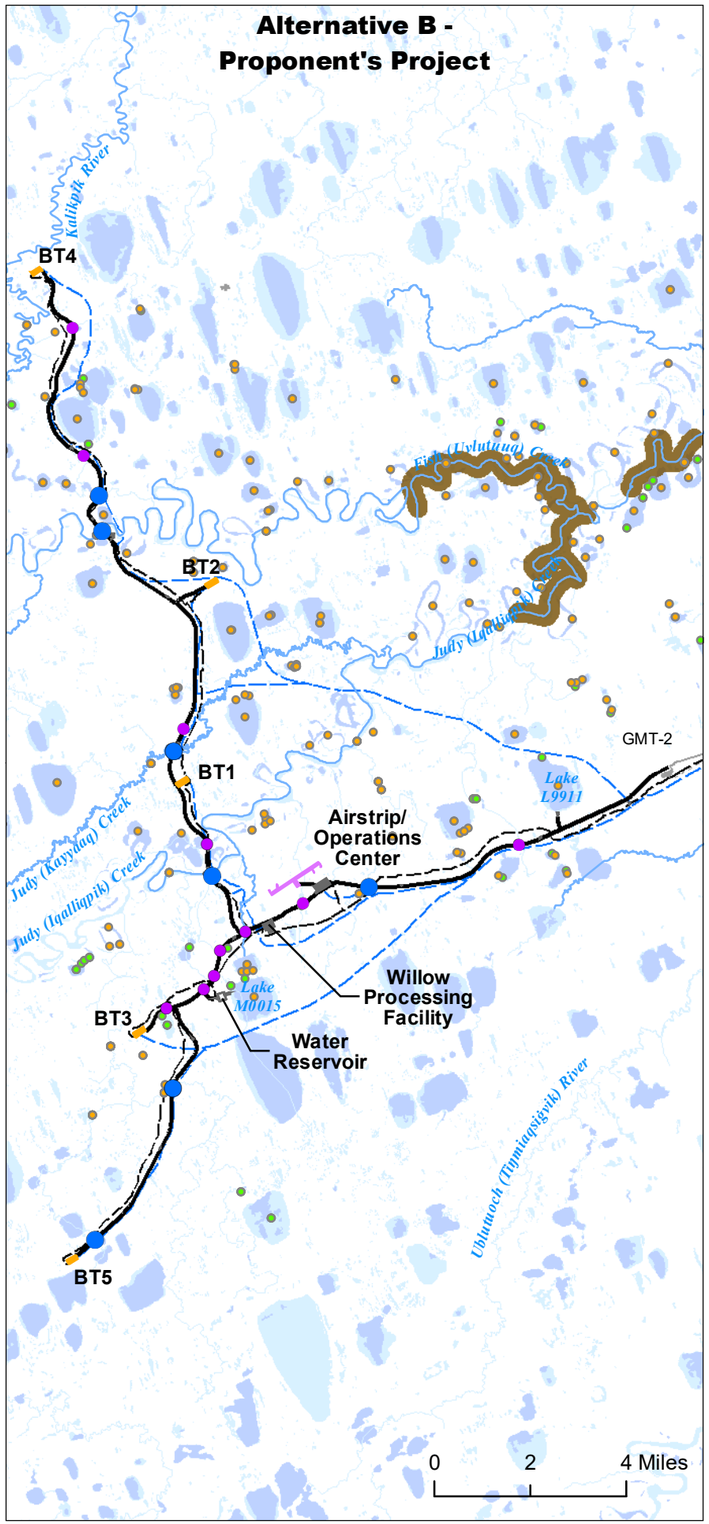
Figure 3.9.3



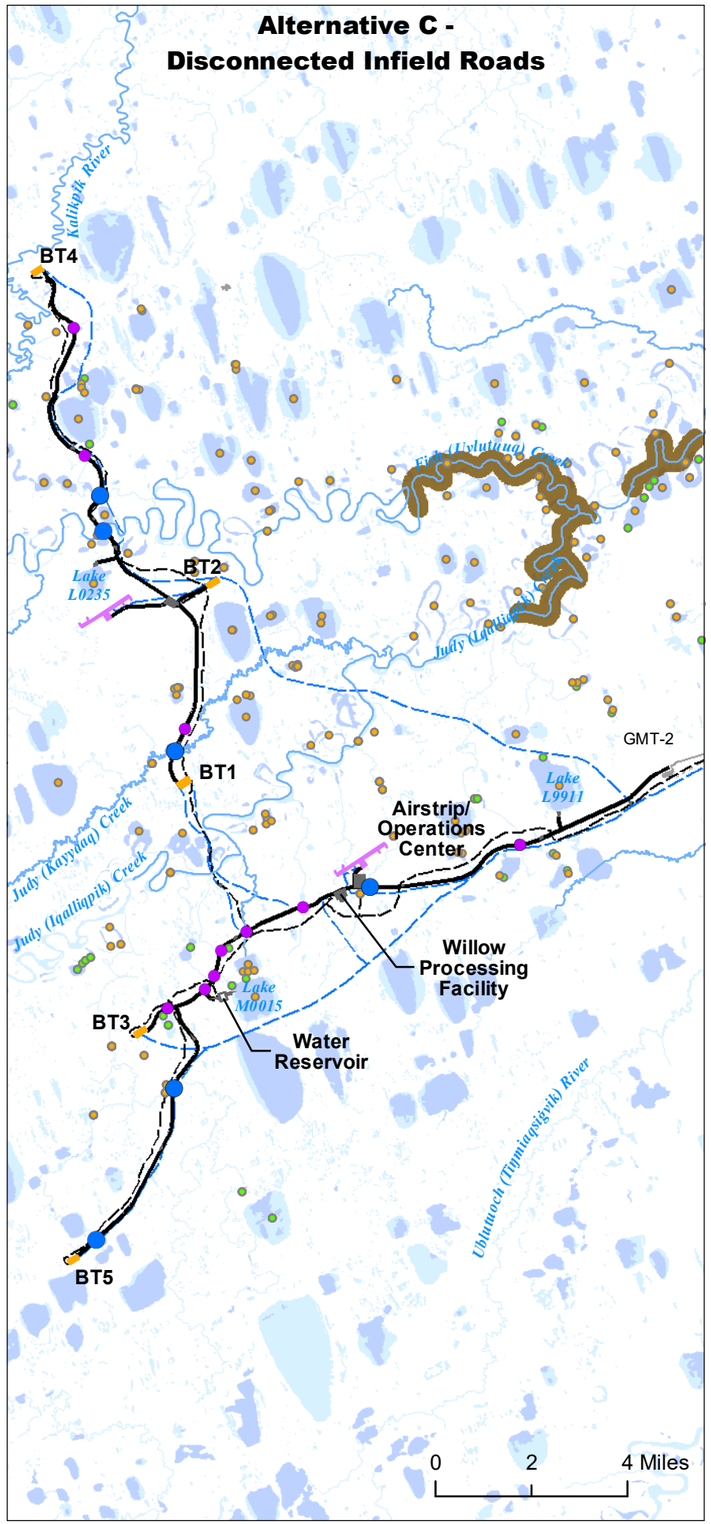
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.10.1

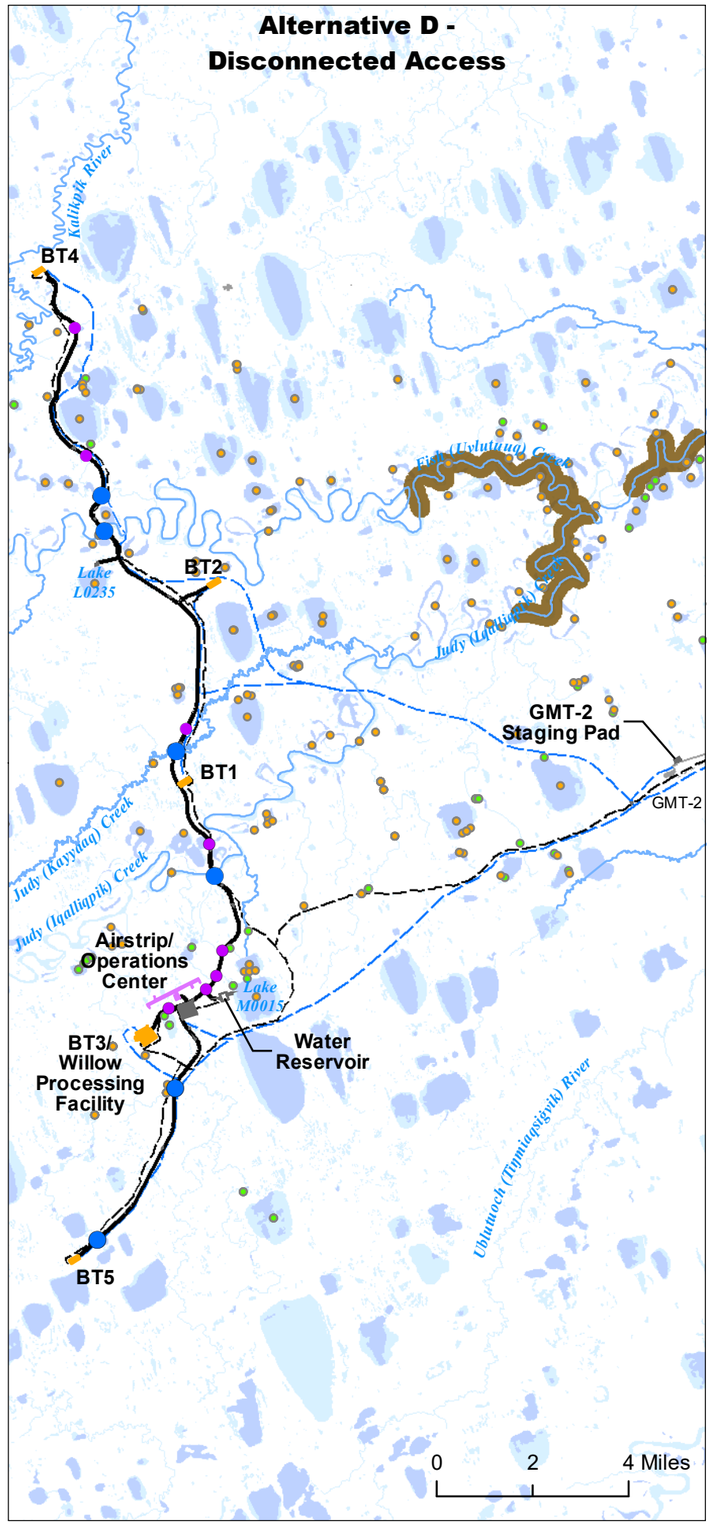
Alternative B - Proponent's Project



Alternative C - Disconnected Infield Roads



Alternative D - Disconnected Access



Fish
- Sensitive Fish
- Resistant Fish
- Anadromous Stream
- Overwinter Fish Habitat

North Slope Science Initiative
- Winter Liquid Water Availability

Willow Proposed Development Features
- Culvert Battery
- Bridge
- Gravel Road
- Pipeline
- Ice Road
- Airstrip
- Dilling Site Pad
- Gravel Pad

Other Infrastructure
- Existing Road
- Existing Infrastructure

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.10.2

Module Transfer Island
Point Lonely
Harrison Bay
Teshekpuk Lake
Module Transfer Island
Atigaru Point
Oliktok Point
Oliktok Dock
Mine Site E
Kuparuk
CD3
Alpine
CD2
CD1
CD5
CD4N
Colville River
CPF2
Mine Site C
BT4
Kalikpik River
BT2
GMT-1
Gravel Mine Site
NUIQSUT
Horizontal Directional Dirlling Pads
Fish (Uvlutuuq) Creek
Judy (Kayyaaq) Creek
GMT-2
BT1
BT3
Judy (Aadliqpik) Creek
Ublutuoch (Tipmiaqsigvik) River
BT5
DS2P
0 5 10 Miles

INSET A
Gravel Mine Site
Ublutuoch (Tipmiaqsigvik) River
Bill's Creek

Bird Habitat

No. of Species Using
- 1-10
- 11 - 20
- 21 - 30
- >30

Willow Proposed Development Features
- Drill Site (Not to Scale)
- Ice Road
- New Pipeline Existing VSM
- New Pipeline New VSM
- Option 3 Existing Road
- Gravel Footprint
- Analysis Area

Other Infrastructure
- Existing Road
- Existing Pipeline
- Existing Infrastructure

Land Designation
- National Petroleum Reserve in Alaska

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.11.1

Module Transfer Island
Point Lonely
Harrison Bay
Teshekpuk Lake
Module Transfer Island
Atigaru Point
Oliktok Point
Oliktok Dock
Mine Site E
Kuparuk
CD3
Alpine
CD2
CD1
CD5
CD4N
Colville River
CPF2
Mine Site C
GMT-1
Gravel Mine Site
NUIQSUT
Horizontal Directional Dirlling Pads
BT4
BT2
BT1
BT3
BT5
GMT-2
Kalikpik River
Fish (Uvlutuuq) Creek
Judy (Kayyaaq) Creek
Judy (Iqalliqpik) Creek
Ublutuoch (Tiŋmiaqsiġvik) River
DS2P
0 5 10 Miles

INSET A
Gravel Mine Site
Ublutuoch (Tiŋmiaqsiġvik) River
Bill's Creek

Spectacled Eider
- ABR Pre-Breeding Observations 1992-2019
- USFWS Pre-Breeding Observations 1992-2019
- Unsurveyed by USFWS
- Willow Study Area 2017-2019
- Kuparuk Study Area 1993-2015 and 2019
- Colville Study Area 1993-2019

Estimated June Density, 2012 to 2015
(Birds per square mile)
- 0 to 0.08
- >0.08 to 0.26
- >0.26 to 0.51
- >0.51 to 0.87
- >0.87 to 2.22
- >2.22

Willow Proposed Development Features
- Drill Site (Not to Scale)
- Ice Road
- New Pipeline Existing VSM
- New Pipeline New VSM
- Option 3 Existing Road
- Gravel Footprint
- Analysis Area

Other Infrastructure
- Existing Road
- Existing Pipeline
- Existing Infrastructure

Land Designation
- National Petroleum Reserve in Alaska

Data Sources:
Observations were collected during 1992-2019 avian studies conducted by ABR and funded by ConocoPhillips Alaska, Inc. Surveys were not conducted the same number of years across the area displayed; surveys were conducted 18 years in NPR-A, 26 years on the Colville River Delta, and 24 years in Kuparuk.
USFWS 2016, BLM Unpublished Data
Estimated density from USFWS 2016, unpublished data, produced by interpolation using a linear regression spline model based on a 10 x 10 km sample grid of Arctic Coastal Plain aerial breeding waterbird surveys, 2012-2015. Refer to Larned et al. 2012 for survey methodology.
Remaining portions of NPR-A portrayed in the figure were surveyed in miscellaneous years 1999-2014.

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.11.2

Module Transfer Island
Point Lonely
Harrison Bay
Teshekpuk Lake
Module Transfer Island
Atigaru Point
Oliktok Point
Oliktok Dock
Mine Site E
Kuparuk
CD3
Alpine
CD2
CD1
CD5
CD4N
Colville River
CPF2
Mine Site C
BT4
Kalikpik River
BT2
GMT-1
INSET A
Gravel Mine Site
NUIQSUT
Horizontal Directional Dirlling Pads
Fish (Uvlutuuq) Creek
Judy (Kayyaaq) Creek
BT1
GMT-2
Judy (Iaaliqpik) Creek
BT3
Ublutuoch (Tinmiaqsigvik) River
BT5
DS2P
0 5 10 Miles

INSET A
Gravel Mine Site
Ublutuoch (Tinmiaqsigvik) River
Bill's Creek

Yellow-Billed Loon
- Nests
- BMP E-11 Lake/Nest Buffers
- ABR Survey Area 1992 to 2019
- Unsurveyed by USFWS

Estimated June Density, 2012 to 2015
(Birds per square mile)
- 0 to 0.05
- >0.05 to 0.16
- >0.16 to 0.31
- >0.31 to 0.50
- >0.50 to 1.30

Willow Proposed Development Features
- Drill Site (Not to Scale)
- Ice Road
- New Pipeline Existing VSM
- New Pipeline New VSM
- Option 3 Existing Road
- Gravel Footprint
- Analysis Area

Other Infrastructure
- Existing Road
- Existing Pipeline
- Existing Infrastructure

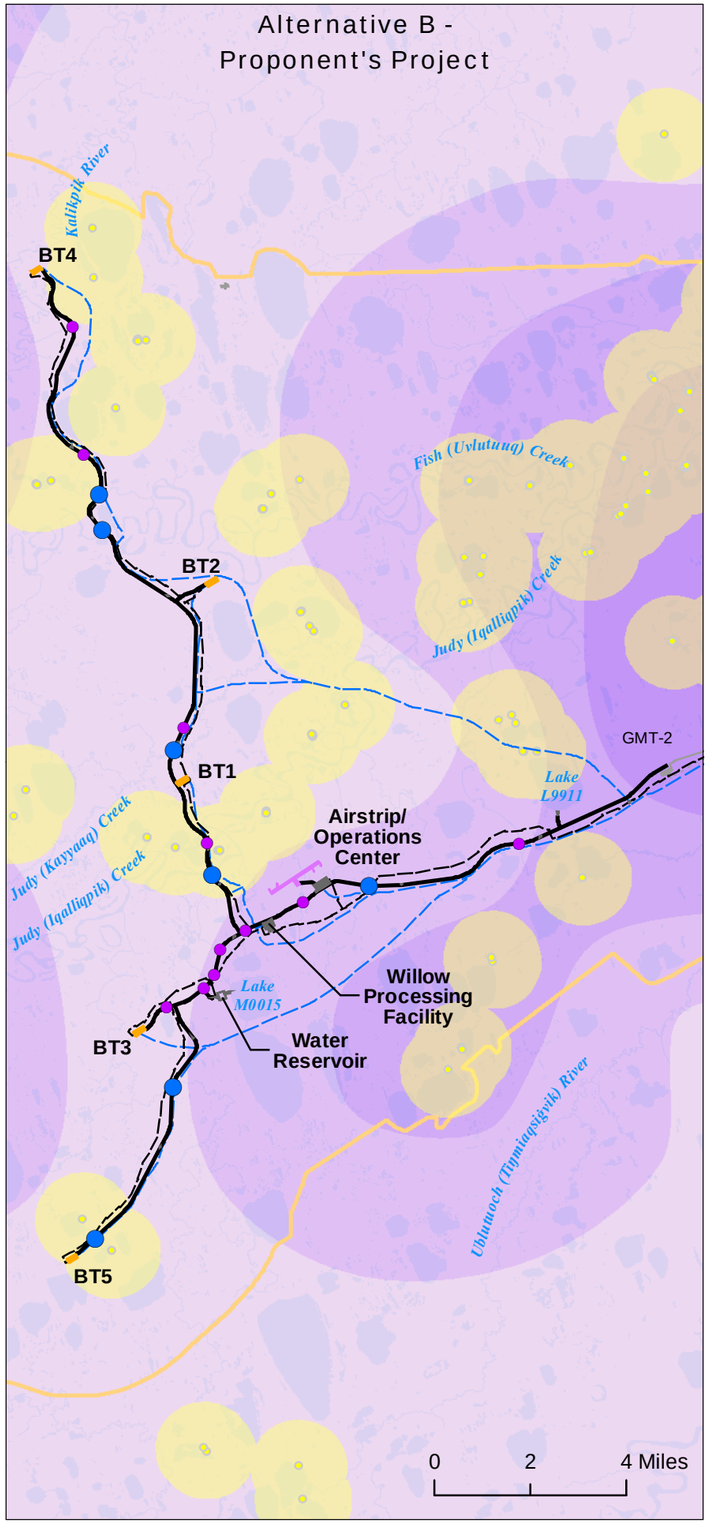
Land Designation
- National Petroleum Reserve in Alaska

Data Sources:
Observations were collected during 1992-2019 avian studies conducted by ABR and funded by ConocoPhillips Alaska, Inc. ABR surveys were not conducted the same number of years across the area displayed; surveys were conducted 16 years in NPR-A, 25 years on the Colville River Delta. USFWS 2016, BLM Unpublished Data Estimated density from USFWS 2016, unpublished data, produced by interpolation using a linear regression spline model based on a 10 x 10 km sample grid of Arctic Coastal Plain aerial breeding waterbird surveys, 2012-2015. Refer to Larned et al. 2012 for survey methodology.

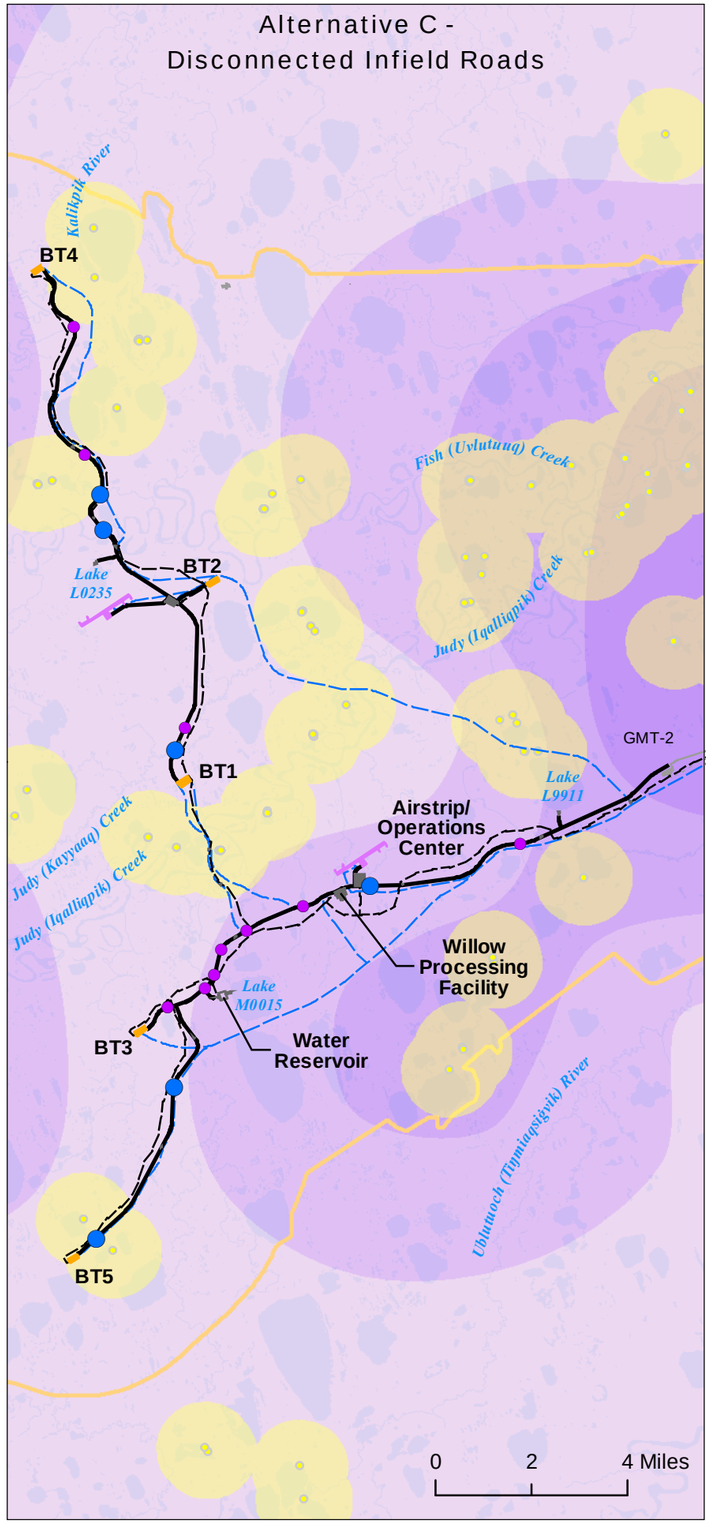
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.11.3

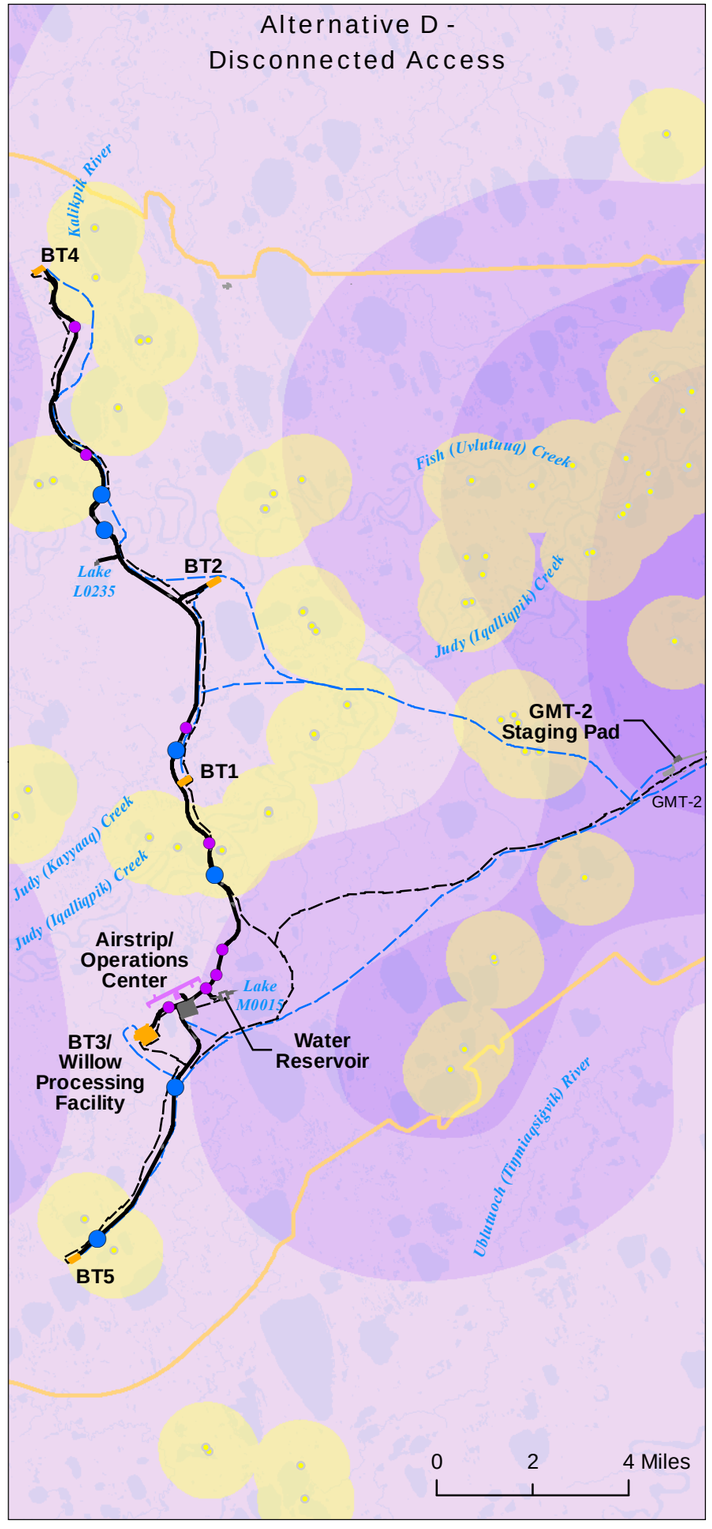
Alternative B - Proponent's Project



Alternative C - Disconnected Infield Roads



Alternative D - Disconnected Access



Yellow-Billed Loon

- Nests
- Lake/Nest Buffer
- ABR Survey Area 1992 to 2019

Estimated June Density, 2012 to 2015 (Birds per square mile)

- 0 to 0.05
- >0.05 to 0.16
- >0.16 to 0.31
- >0.31 to 0.50
- >0.50 to 1.30

Willow Proposed Development Features

- Culvert Battery
- Bridge
- Gravel Road
- Pipeline
- Ice Road
- Airstrip
- Dilling Site Pad
- Gravel Pad

Other Infrastructure

- Existing Road
- Existing Pipeline
- Existing Infrastructure

Data Sources:
Observations were collected during 2001-2010, 2014, 2017-2019 2019 avian studies conducted by ABR and funded by ConocoPhillips Alaska, Inc. ABR surveys were not conducted the same number of years across the area displayed; surveys were conducted 16 years in NPR-A, 25 years on the Colville River Delta. USFWS 2013, BLM Unpublished Data Estimated density from USFWS 2016, unpublished data, produced by interpolation using a linear regression spline model based on a 10 x 10 km sample grid of Arctic Coastal Plain aerial breeding waterbird surveys, 2012-2015. Refer to Larned et al. 2012 for survey methodology.

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.11.4

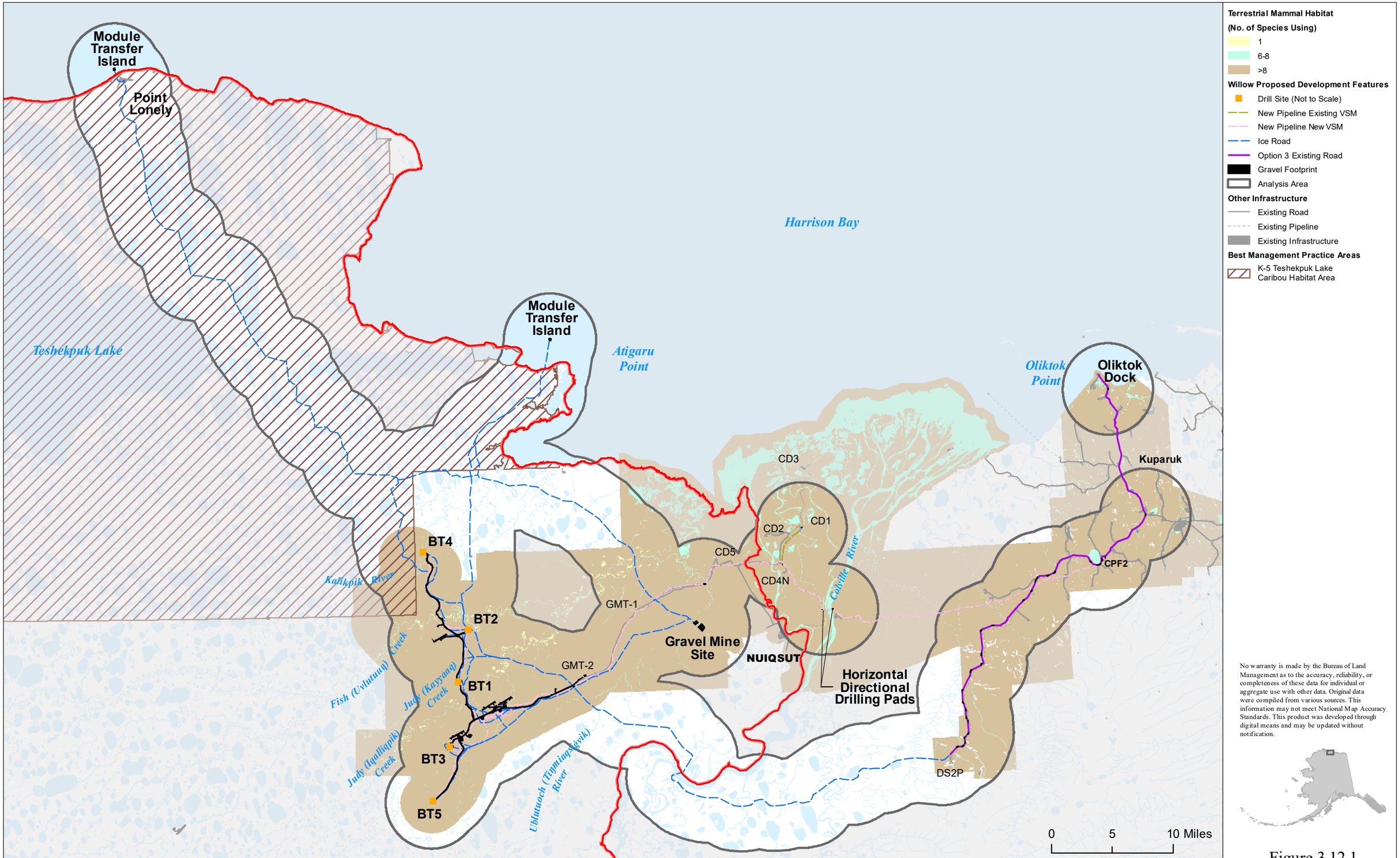

Terrestrial Mammal Habitat
(No. of Species Using)
1
6-8
>8
Willow Proposed Development Features
Drill Site (Not to Scale)
New Pipeline Existing VSM
New Pipeline New VSM
Ice Road
Option 3 Existing Road
Gravel Footprint
Analysis Area
Other Infrastructure
Existing Road
Existing Pipeline
Existing Infrastructure
Best Management Practice Areas
K-5 Teshekpuk Lake Caribou Habitat Area
Module Transfer Island
Point Lonely
Module Transfer Island
Harrison Bay
Teshekpuk Lake
Atigaru Point
Oliktok Point
Oliktok Dock
Kuparuk
CD3
CD2
CD1
CD5
CD4N
CPF2
BT4
BT2
BT1
BT3
BT5
GMT-1
GMT-2
Gravel Mine Site
NUIQSUT
Horizontal Directional Drilling Pads
DS2P
Kalikpik River
Colville River
Fish (Uvlutuuq) Creek
Judy (Kayyaaq) Creek
Judy (Iqalliqpik) Creek
Ublutuoch (Tiŋmiaqsigvik) River
0
5
10 Miles
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.12.1

UTQIAĠVIK (BARROW)
POINT LONELY
WAINWRIGHT
ATIGARU POINT
OLIKTOK POINT
ATQASUK
DEADHORSE
NUIQSUT
POINT LAY
UMIAT
POINT HOPE
ANAKTUVUK PASS
ARCTIC VILLAGE
BROOKS RANGE
WISEMAN
COLDFOOT
KOTZEBUE
KOBUK
0 30 60 Miles

Teshekpuk Caribou Herd
(Herd Density)
- High
- Medium
- Low

Central Arctic Caribou Herd
(Herd Density)
- High
- Medium
- Low

Willow Proposed Development Features
- Analysis Area
- Gravel Footprint

Land Designation
- National Petroleum Reserve in Alaska

Best Management Practice Areas
- K-5 Teshekpuk Lake Caribou Habitat Area

Note:
Utilization distribution contours from fixed-kernel density estimation analysis of locations of radio-collared female caribou 1990–2018 (telemetry database from ADF&G, North Slope Borough, BLM, and ConocoPhillips Alaska, Inc.). Contours enclose stated percentages of all collar locations. High-, medium-, and low-density areas are the 50%, 75%, and 95% utilization distribution contours, respectively. Bandwidth calculated with the plug-in method.

Source:
Prichard et al. 2019

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.12.2

Central Arctic Herd

(Female Density)

- High
- Medium
- Low

Willow Proposed Development Features

- *Analysis Area*
- Gravel Footprint

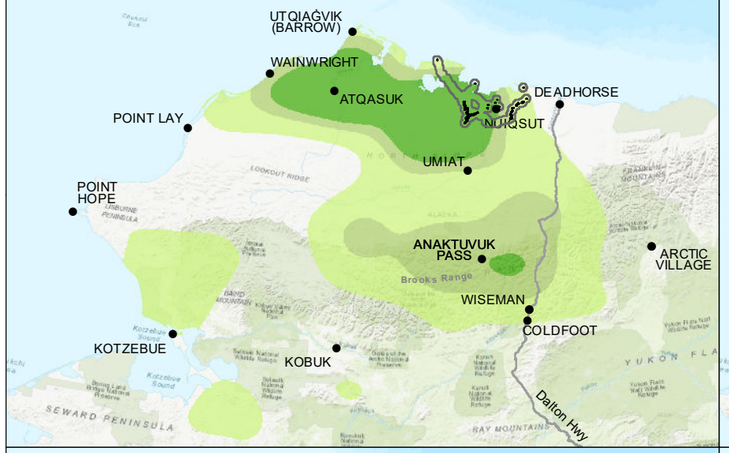
Note:
Utilization distribution contours from fixed-kernel density estimation analysis of locations of radio-collared female caribou 1990–2018 (telemetry database from ADF&G, North Slope Borough, BLM, and ConocoPhillips Alaska, Inc.). Contours enclose stated percentages of all collar locations. High-, medium-, and low-density areas are the 50%, 75%, and 95% utilization distribution contours, respectively. Bandwidth calculated with the plug-in method.

Source:
Prichard et al. 2019

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.12.3

Winter (December 1 - April 30)



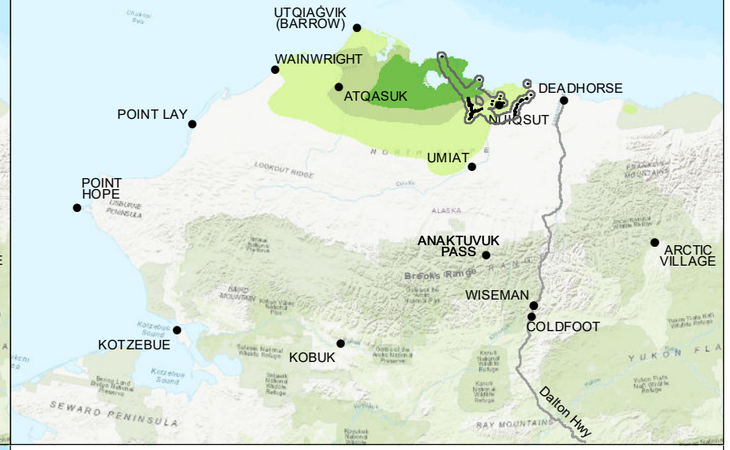
Spring Migration (May 1 - May 29)

Calving (May 30 - June 15)

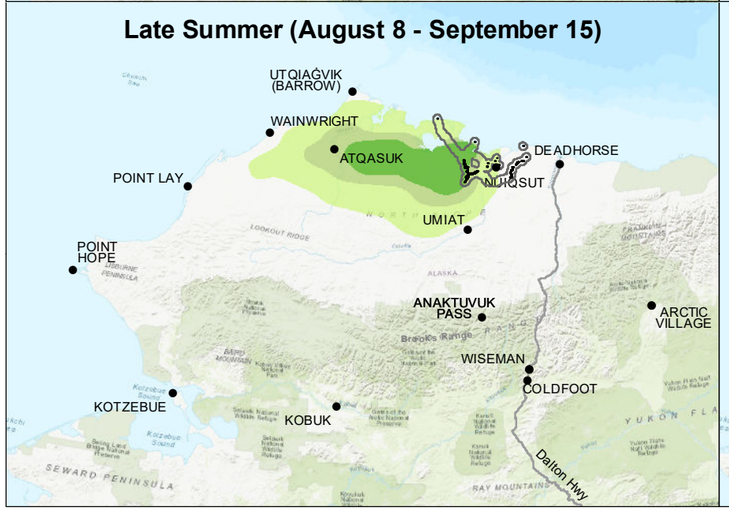
Postcalving (June 16 - June 24)

Mosquito (June 25 - July 15)

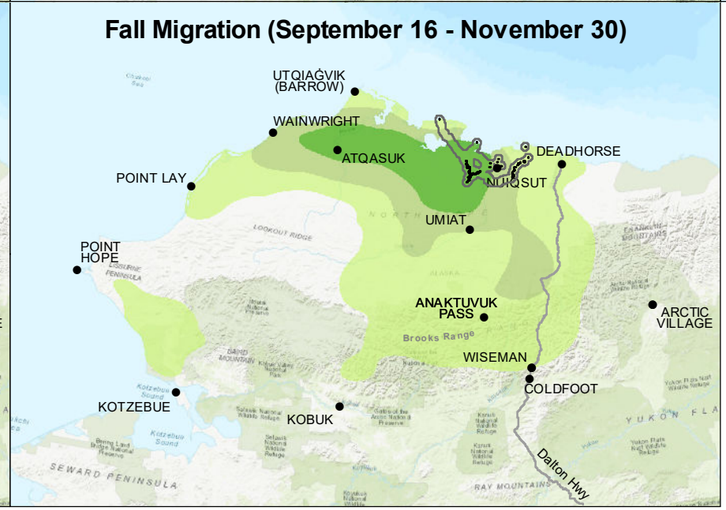
Oestrid Fly (July 16 - August 7)



Late Summer (August 8 - September 15)



Fall Migration (September 16 - November 30)



Teshekpuk Caribou Herd
(Female Density)
- High
- Medium
- Low

Willow Proposed Development Features
- Analysis Area
- Gravel Footprint

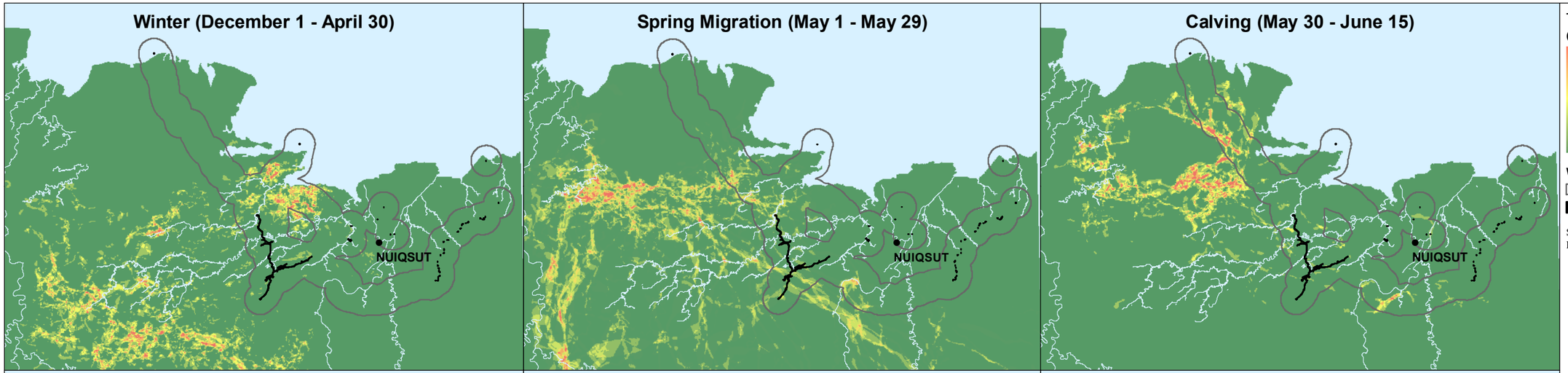
Note:
Utilization distribution contours from fixed-kernel density estimation analysis of locations of radio-collared female caribou 1990–2018 (telemetry database from ADF&G, North Slope Borough, BLM, and ConocoPhillips Alaska, Inc.). Contours enclose stated percentages of all collar locations. High-, medium-, and low-density areas are the 50%, 75%, and 95% utilization distribution contours, respectively. Bandwidth calculated with the plug-in method.

Source:
Prichard et al. 2019

0 100 200 Miles

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.12.4



No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.12.5

Module Transfer Island
Point Lonely
Harrison Bay
Module Transfer Island
Teshekpuk Lake
Atigaru Point
Oliktok Point
Oliktok Dock
Kuparuk
CD3
CD2
CD1
CD5
CD4N
Colville River
CPF2
BT4
Kalikpik River
GMT-1
BT2
Gravel Mine Site
NUIQSUT
Horizontal Directional Drilling Pads
GMT-2
Fish (Uvlutuuq) Creek
Judy (Kayyaaq) Creek
BT1
Judy (Aqalliqpik) Creek
BT3
BT5
Ublutuoch (Tinmiaqsivik) River
DS2P
0 5 10 Miles

Teshekpuk Caribou Herd
(Calving Density[a])
- High
- Medium
- Low

Willow Proposed Development Features
- Drill Site (Not to Scale)
- Ice Road
- New Pipeline Existing VSM
- New Pipeline New VSM
- Option 3 Existing Road
- Gravel Footprint
- Analysis Area

Other Infrastructure
- Existing Road
- Existing Pipeline
- Existing Infrastructure

Land Designation
- National Petroleum Reserve in Alaska

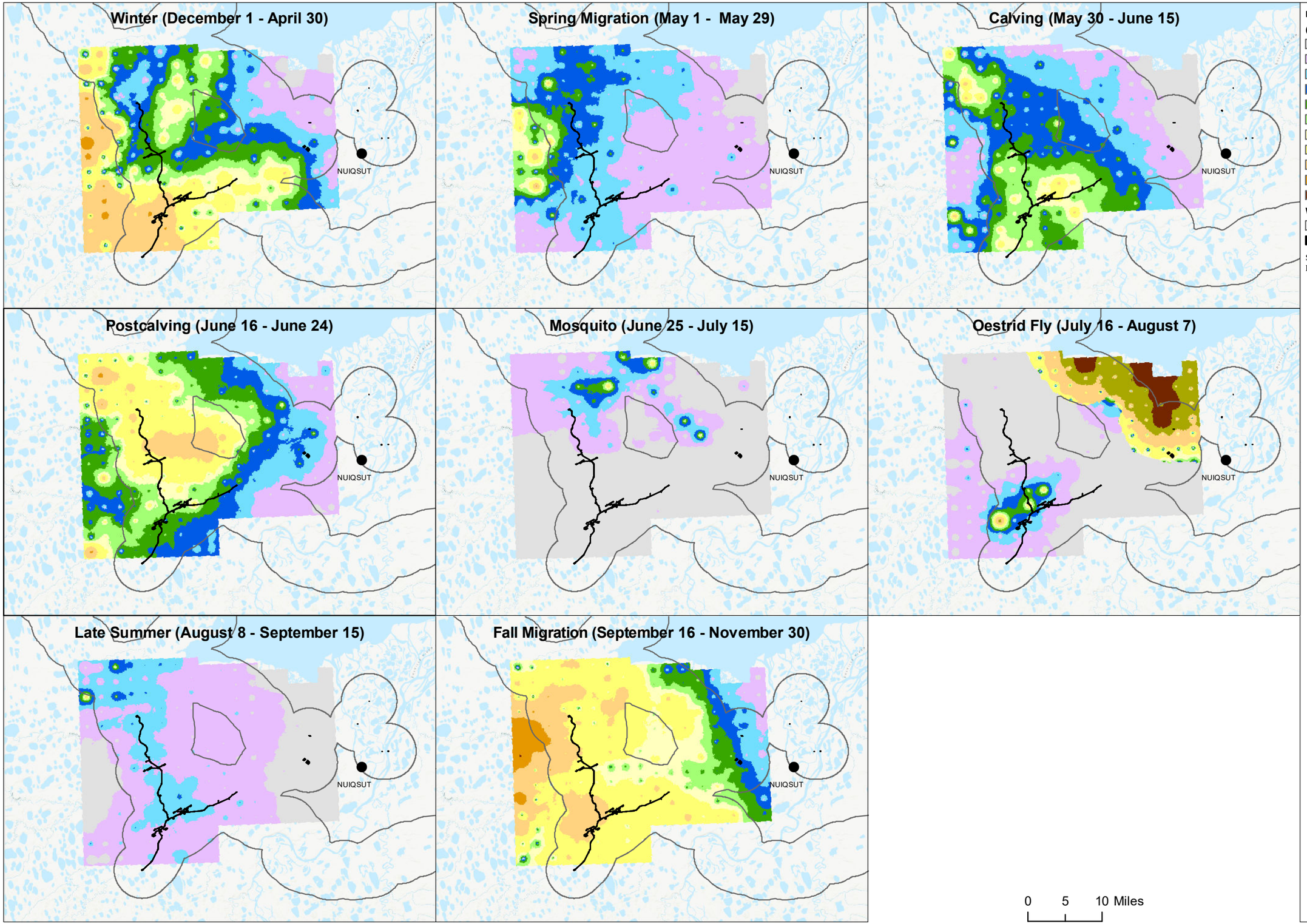
Best Management Practice Areas
- Teshekpuk Lake Special Area[b]
- K-5 Teshekpuk Lake Caribou Habitat Area[b]

Note:
Utilization distribution contours from fixed-kernel density estimation analysis of locations of radio-collared female caribou 1990–2018 (telemetry database from ADF&G, North Slope Borough, BLM, and ConocoPhillips Alaska, Inc.). Contours enclose stated percentages of all collar locations. High-, medium-, and low-density areas are the 50%, 75%, and 95% utilization distribution contours, respectively. Bandwidth calculated with the plug-in method.

Source:
a. Prichard et al. 2019
b. BLM 2013a

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.12.6



No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.12.7

Module Transfer Island
Point Lonely
Harrison Bay
Module Transfer Island
Teshekpuk Lake
Atigaru Point
Oliktok Point
Oliktok Dock
CD3
Kuparuk
Alpine
CD2
CD1
CD5
CD4N
Colville River
CPF2
BT4
Kalikpik River
BT2
GMT-1
INSET A
NUIQSUT
Horizontal Directional Drilling Pads
BT1
GMT-2
Fish (Uylutuuq) Creek
Judy (Kayyaaq) Creek
Judy (Iqalliapik) Creek
BT3
Ublutuoch (Tinmiagsigvik) River
DS2P
BT5
0 5 10 Miles

INSET A
Multi-Season Ice Pad
Gravel Mine Site
Ublutuoch (Tinmiagsigvik) River
Bill's Creek

Polar Bear
- Historical Maternal Den
- Potential Terrestrial Denning Habitat
- Terrestrial Denning Critical Habitat
- Barrier Island No Disturbance Zone
- Barrier Island Critical Habitat
- Critical Habitat Exclusions
- Sea-Ice Critical Habitat

Willow Proposed Development Features
- Drill Site (Not to Scale)
- Ice Road
- Gravel Footprint
- Screeding
- Analysis Area

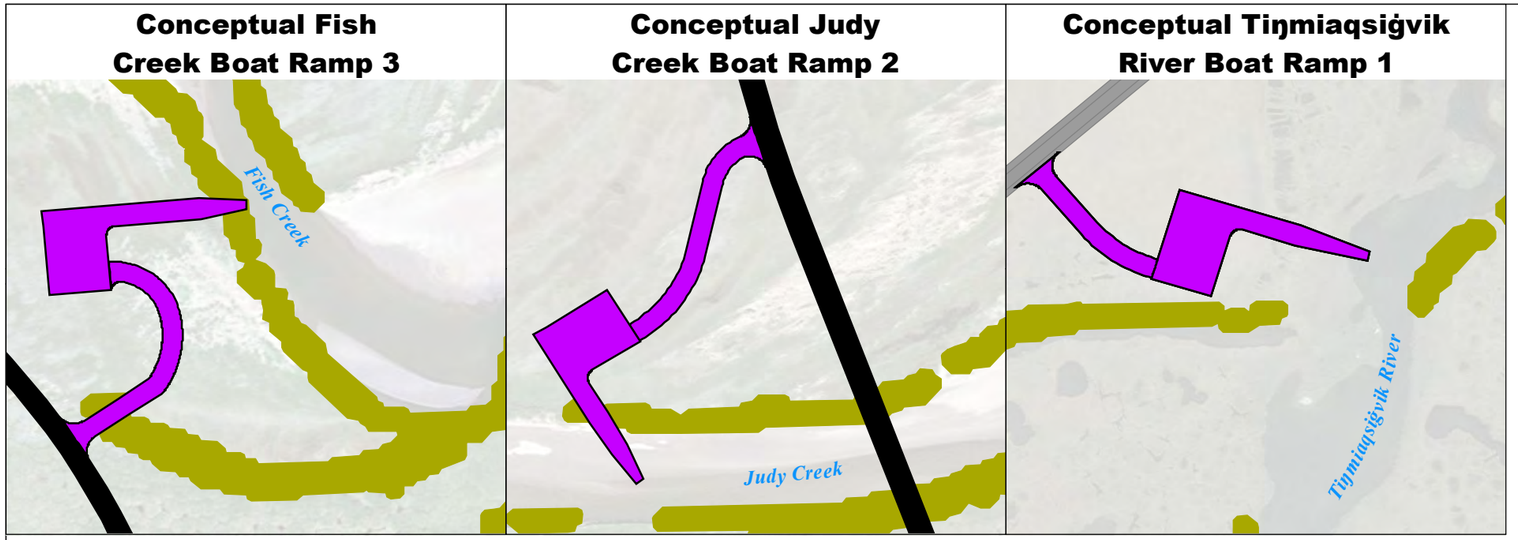
Other Infrastructure
- Existing Road
- Existing Pipeline
- Existing Infrastructure

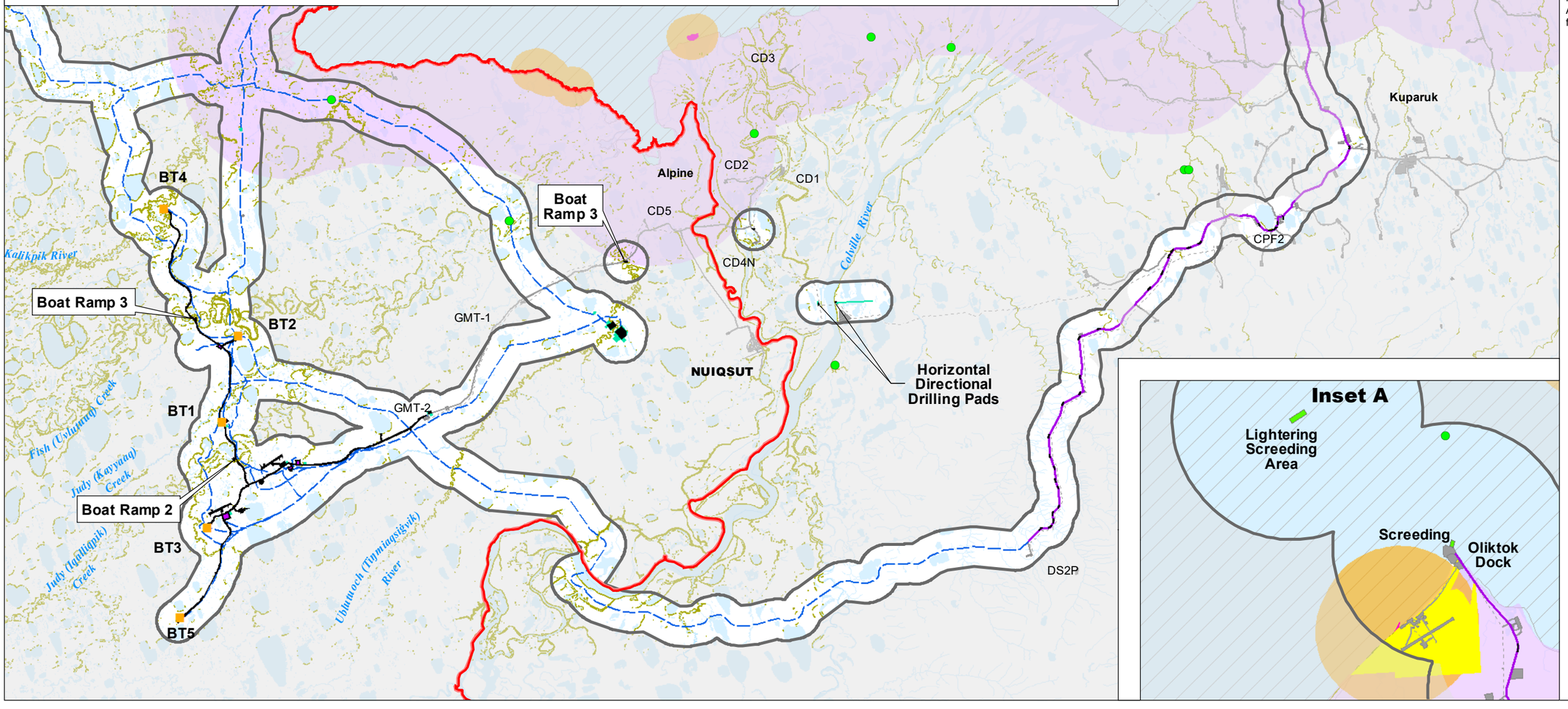
Land Designation
- National Petroleum Reserve in Alaska

Note:
Analysis area also includes marine area from Point Lonely to Oliktok Point

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.13.1





Polar Bear
- Historical Maternal Den
- Potential Terrestrial Denning Habitat
- Terrestrial Denning Critical Habitat
- Barrier Island No Disturbance Zone
- Barrier Island Critical Habitat
- Critical Habitat Exclusions
- Sea-Ice Critical Habitat

Willow Proposed Development Features
- Drill Site (Not to Scale)
- Ice Road
- Gravel Footprint
- Boat Ramp
- Screeding
- Analysis Area

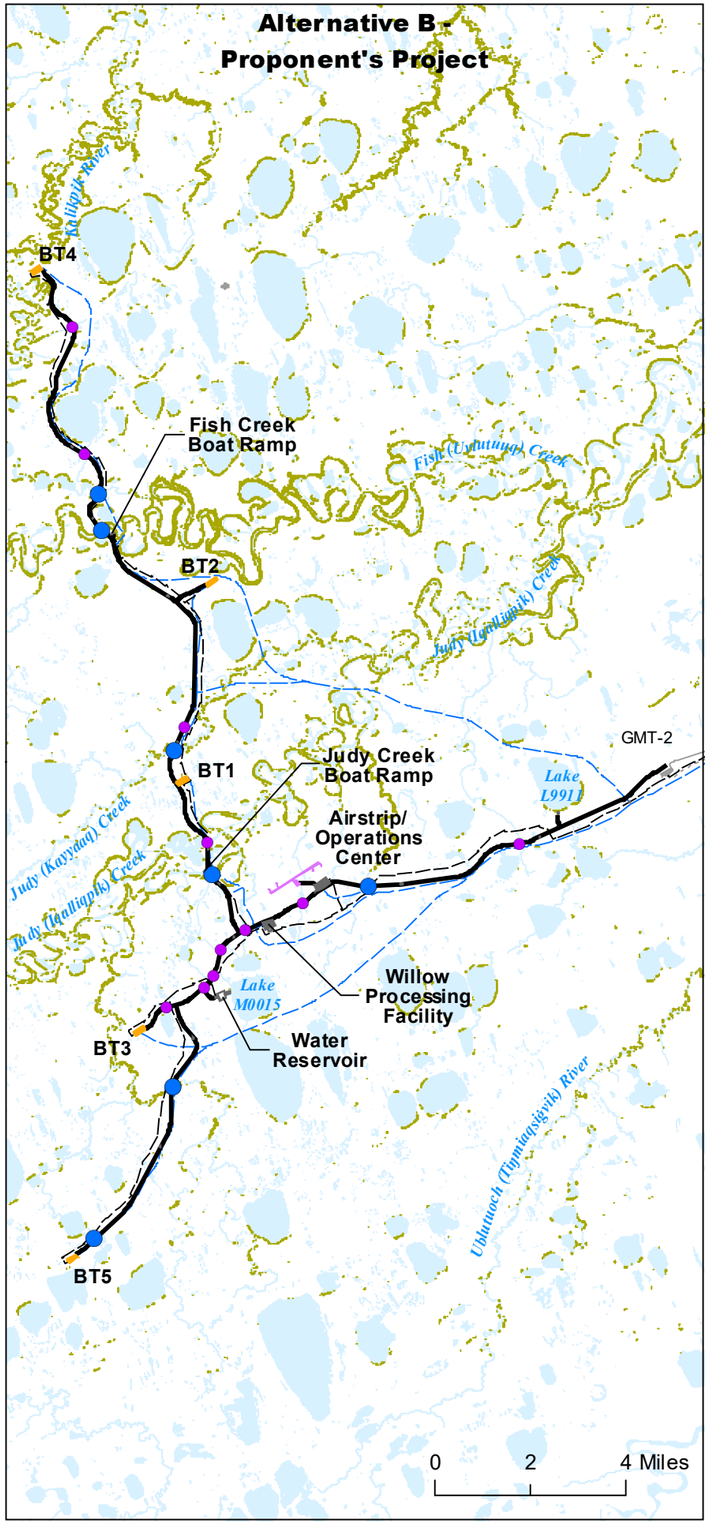
Other Infrastructure
- Existing Road
- Existing Pipeline
- Existing Infrastructure

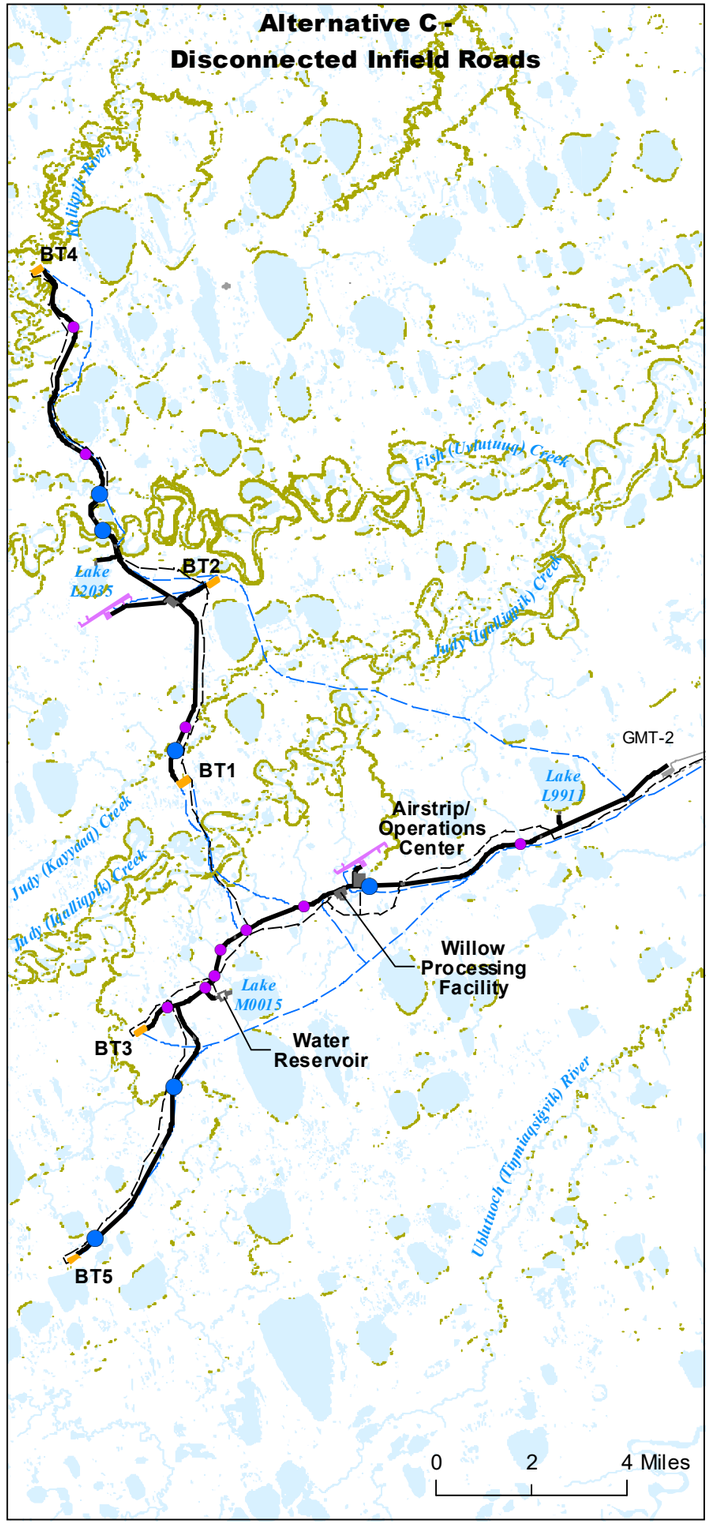
Land Designation
- National Petroleum Reserve in Alaska

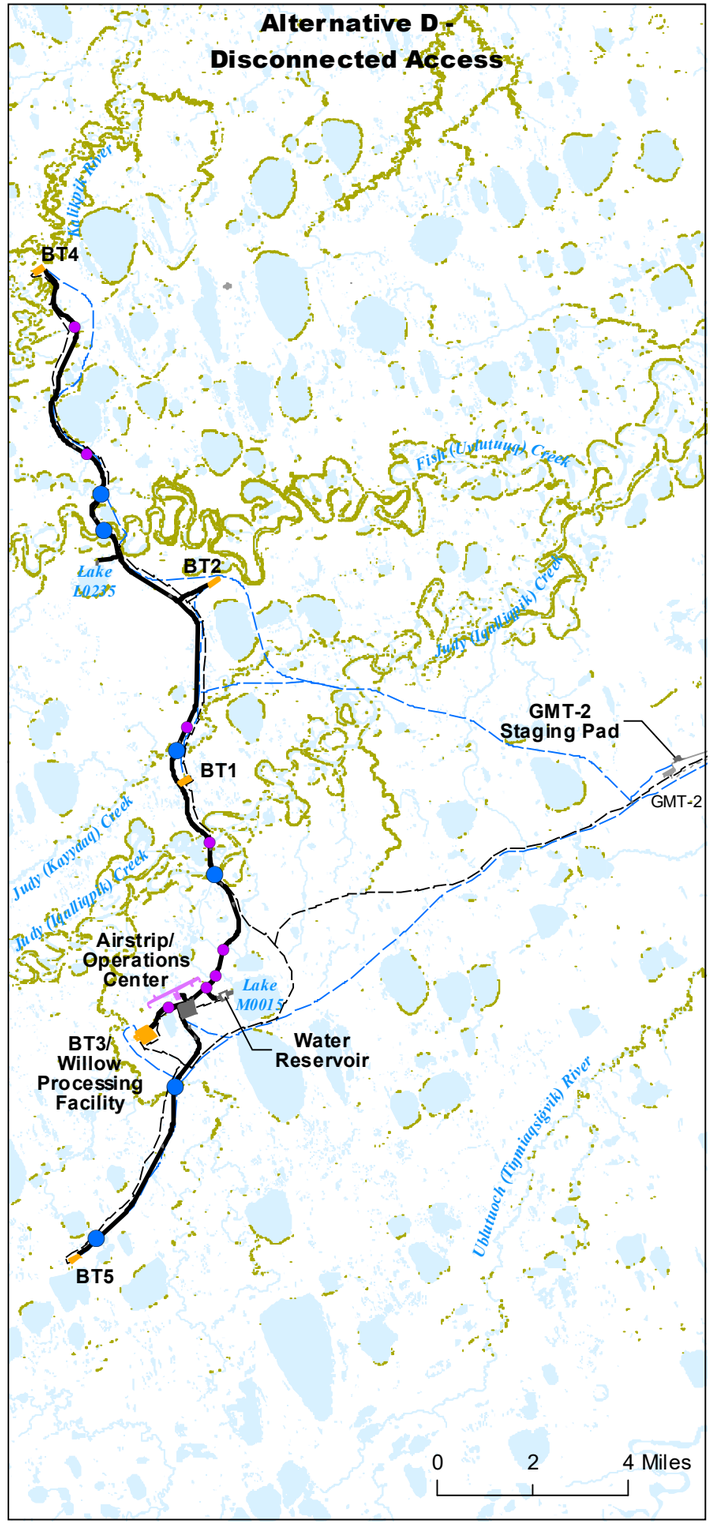
Note:
Analysis area also includes marine area from Point Lonely to Oliktok Point

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.13.2







Polar Bear

- Potential Terrestrial Denning Habitat

Willow Proposed Development Features

- Culvert Battery
- Bridge
- Gravel Road
- Pipeline
- Ice Road
- Airstrip
- Dill Site
- Gravel Pad

Other Infrastructure

- Existing Road
- Existing Pipeline
- Existing Infrastructure

Sources:
Observations were collected during 1992-2018 avian studies conducted by ABR and funded by ConocoPhillips Alaska, Inc. Surveys were not conducted the same number of years across the area displayed; surveys were conducted 17 years in NPR-A, 25 years on the Colville River Delta, and 24 years in Kuparuk.
USFWS 2013, BLM Unpublished Data
Estimated density from USFWS 2016, unpublished data, produced by interpolation using a linear regression spline model based on a 10 x 10 km sample grid of Arctic Coastal Plain aerial breeding waterbird surveys, 2012-2015. Refer to Larned et al. 2012 for survey methodology.

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.13.3

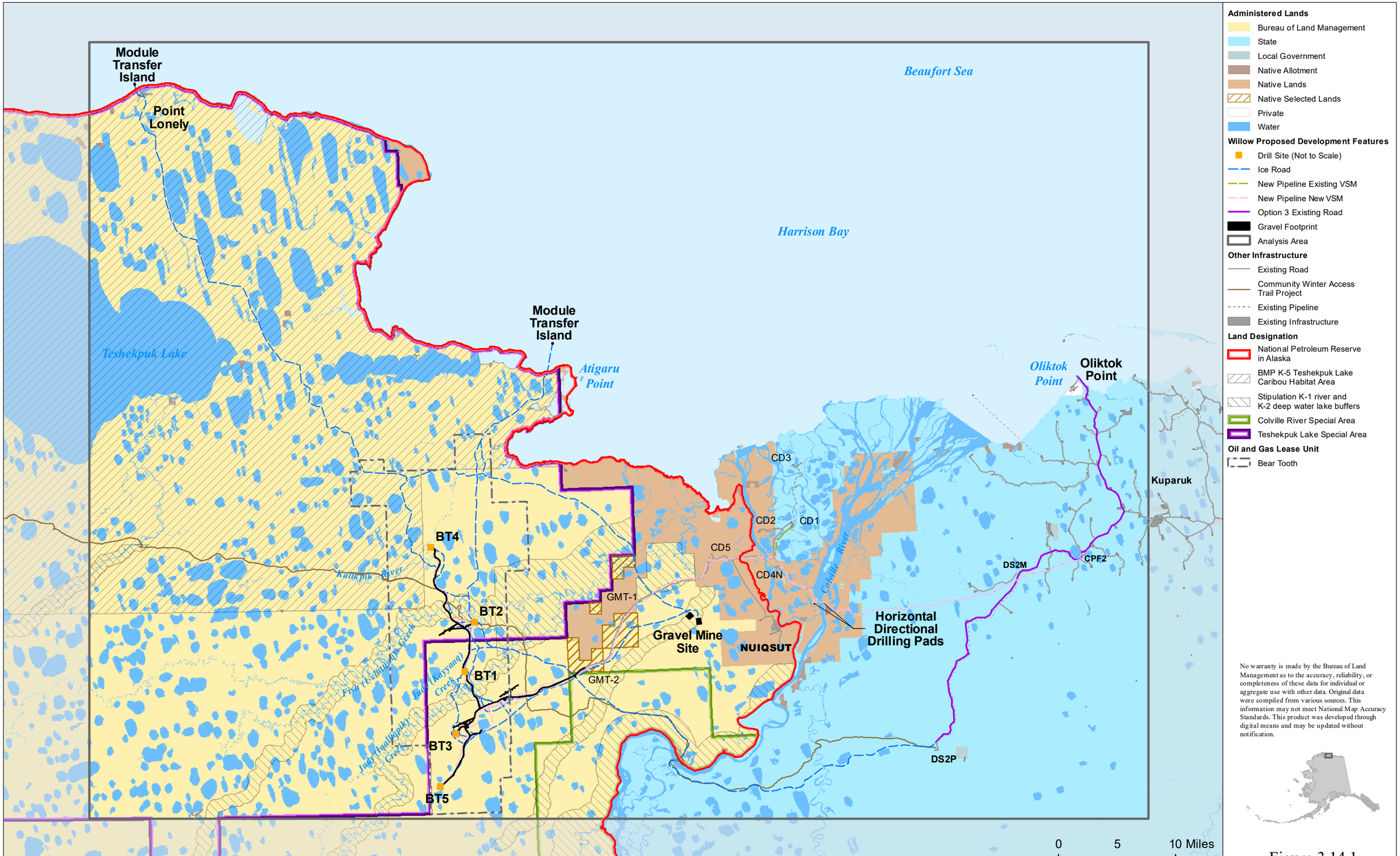
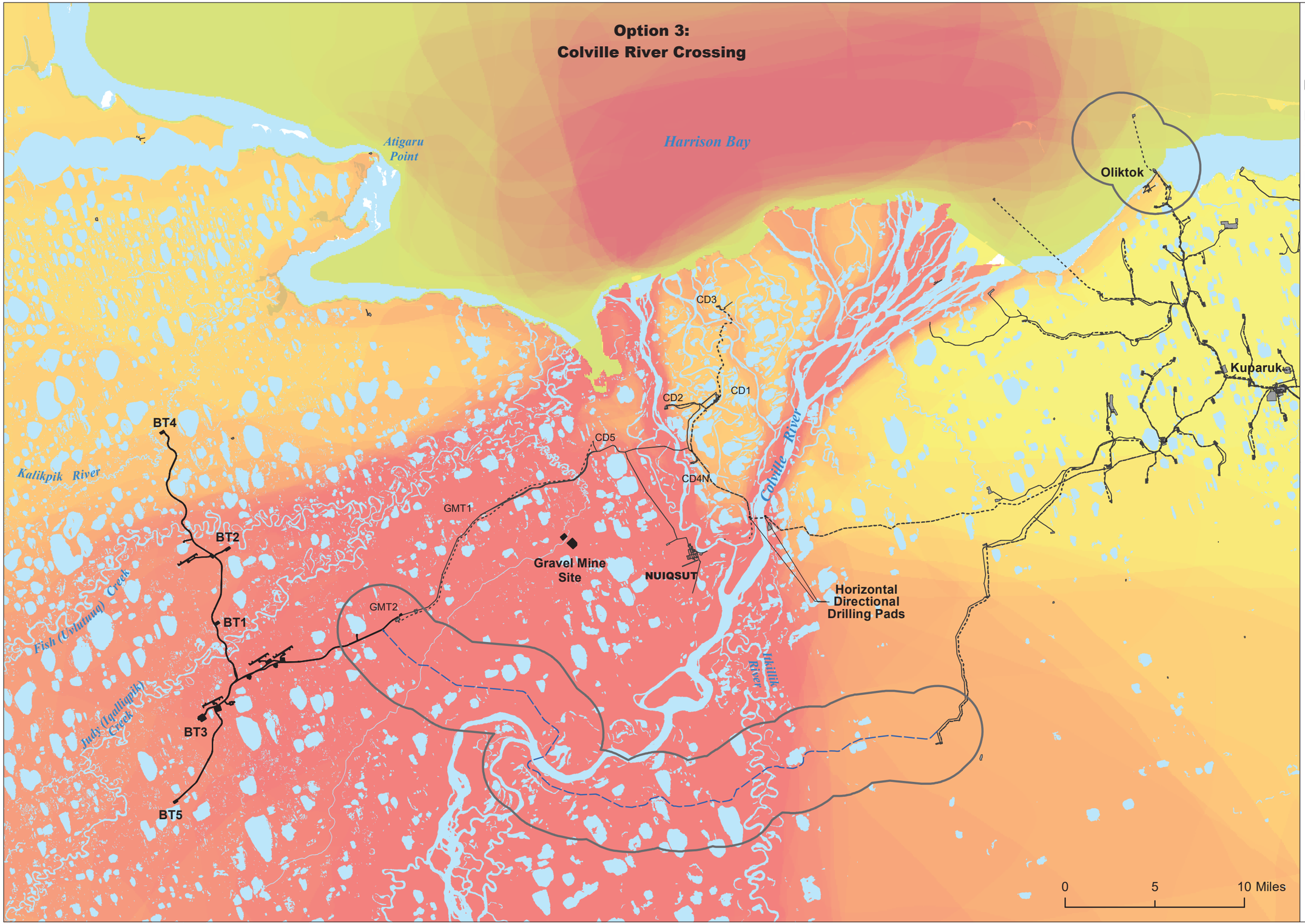

Module Transfer Island
Point Lonely
Beaufort Sea
Harrison Bay
Teshekpuk Lake
Module Transfer Island
Atigaru Point
Oliktok Point
Oliktok Point
Kuparuk
CD3
CD2
CD1
CD5
CD4N
Colville River
DS2M
CPF2
BT4
Kalikpik River
GMT-1
BT2
Gravel Mine Site
NUIQSUT
Horizontal Directional Drilling Pads
BT1
GMT-2
Fish (Ustutuliq) Creek
Judy (Kayyaaq) Creek
BT3
Judy (Iqalliqpik) Creek
BT5
DS2P
0
5
10 Miles
Administered Lands
Bureau of Land Management
State
Local Government
Native Allotment
Native Lands
Native Selected Lands
Private
Water
Willow Proposed Development Features
Drill Site (Not to Scale)
Ice Road
New Pipeline Existing VSM
New Pipeline New VSM
Option 3 Existing Road
Gravel Footprint
Analysis Area
Other Infrastructure
Existing Road
Community Winter Access Trail Project
Existing Pipeline
Existing Infrastructure
Land Designation
National Petroleum Reserve in Alaska
BMP K-5 Teshekpuk Lake Caribou Habitat Area
Stipulation K-1 river and K-2 deep water lake buffers
Colville River Special Area
Teshekpuk Lake Special Area
Oil and Gas Lease Unit
Bear Tooth
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.14.1



Willow Proposed Development Features

Subsistence Data

- High / Low — Overlapping Subsistence Use Areas All Resources, 1995-2006 [a]
- Module Transport Analysis Area
- Ice Road
- Gravel Footprint

Other Infrastructure

- Existing Road
- Existing Pipeline
- Existing Infrastructure

Map prepared by
Stephen R. Braund & Associates

Source
a. SRB&A 2010a

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.16.1

Option 3:
Colville River Crossing

Harrison Bay
Atigaru Point
Oliktok
Kuparuk
CD3
CD2
CD1
CD5
CD4N
Colville River
BT4
Kalikpik River
GMT1
BT2
Gravel Mine Site
NUIQSUT
Horizontal Directional Drilling Pads
Fish (Uvlutuuq) Creek
GMT2
BT1
Judy (Iqalliqpik) Creek
Itkillik River
BT3
BT5
0 5 10 Miles

Willow Proposed Development Features

Subsistence Data

- High / Low — Overlapping Subsistence Use Areas Caribou, 1995-2006 [a]
- Module Transport Analysis Area
- Ice Road
- Gravel Footprint

Other Infrastructure

- Existing Road
- Existing Pipeline
- Existing Infrastructure

Map prepared by
Stephen R. Braund & Associates

Source
a. SRB&A 2010a

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.16.2

Option 3: Colville River Crossing

Atigaru Point
Harrison Bay
Oliktok
Kuparuk
CD3
CD2
CD1
CD5
CD4N
Colville River
GMT1
Gravel Mine Site
NUIQSUT
Horizontal Directional Drilling Pads
GMT2
Miluveach River
BT4
BT2
BT1
BT3
BT5
Kalikpik River
Fish (Uvlutuuq) Creek
Judy (Iqalliqpik) Creek
0
5
10 Miles

Willow Proposed Development Features

Subsistence Data

- Overlapping Subsistence Use Areas Caribou, January 2008 through October 2016 [a] (High / Low)
- Module Transport Analysis Area
- Ice Road
- Gravel Footprint

Other Infrastructure

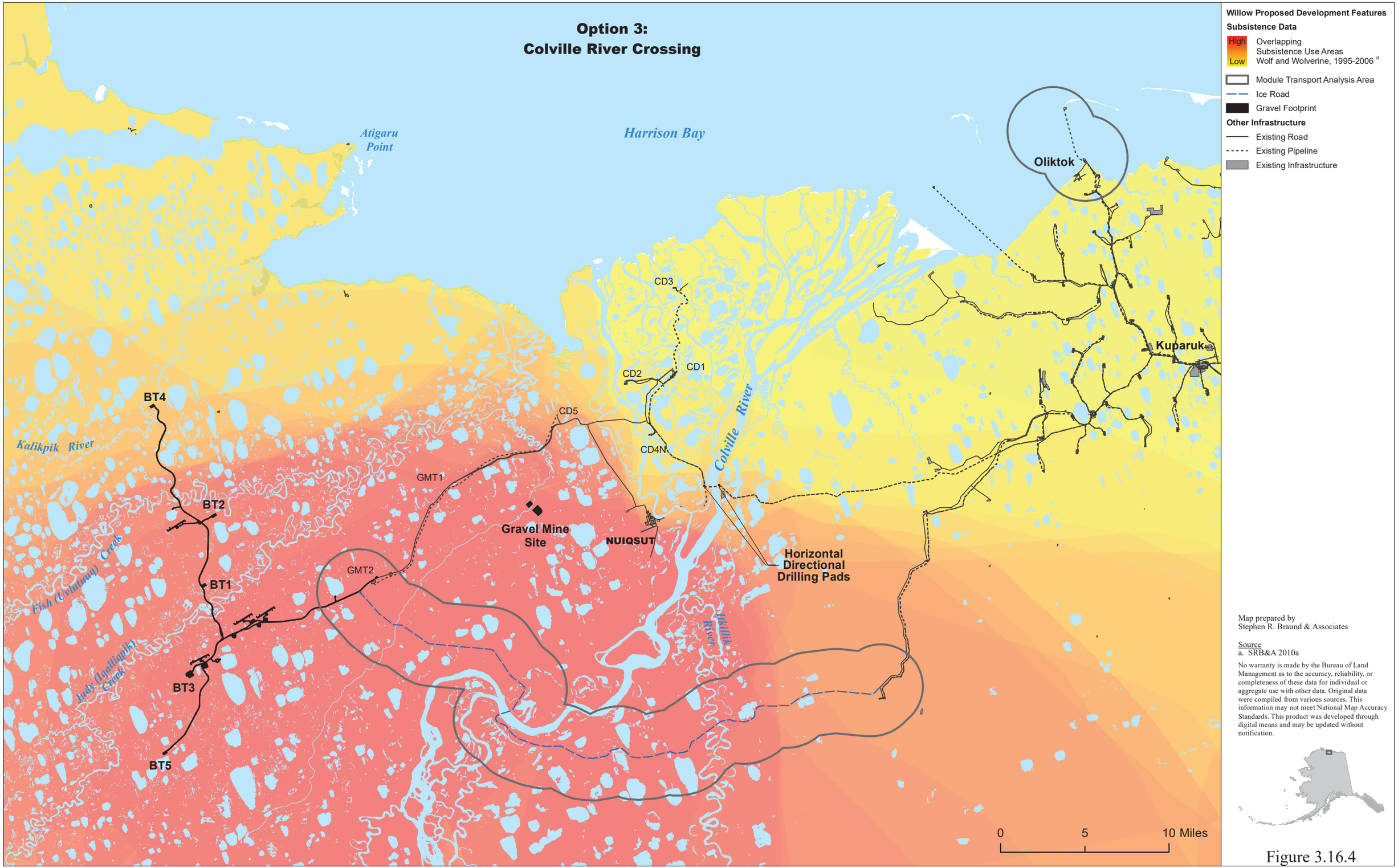
- Existing Road
- Existing Pipeline
- Existing Infrastructure

Map prepared by
Stephen R. Braund & Associates

Source
a. SRB&A 2018

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.16.3



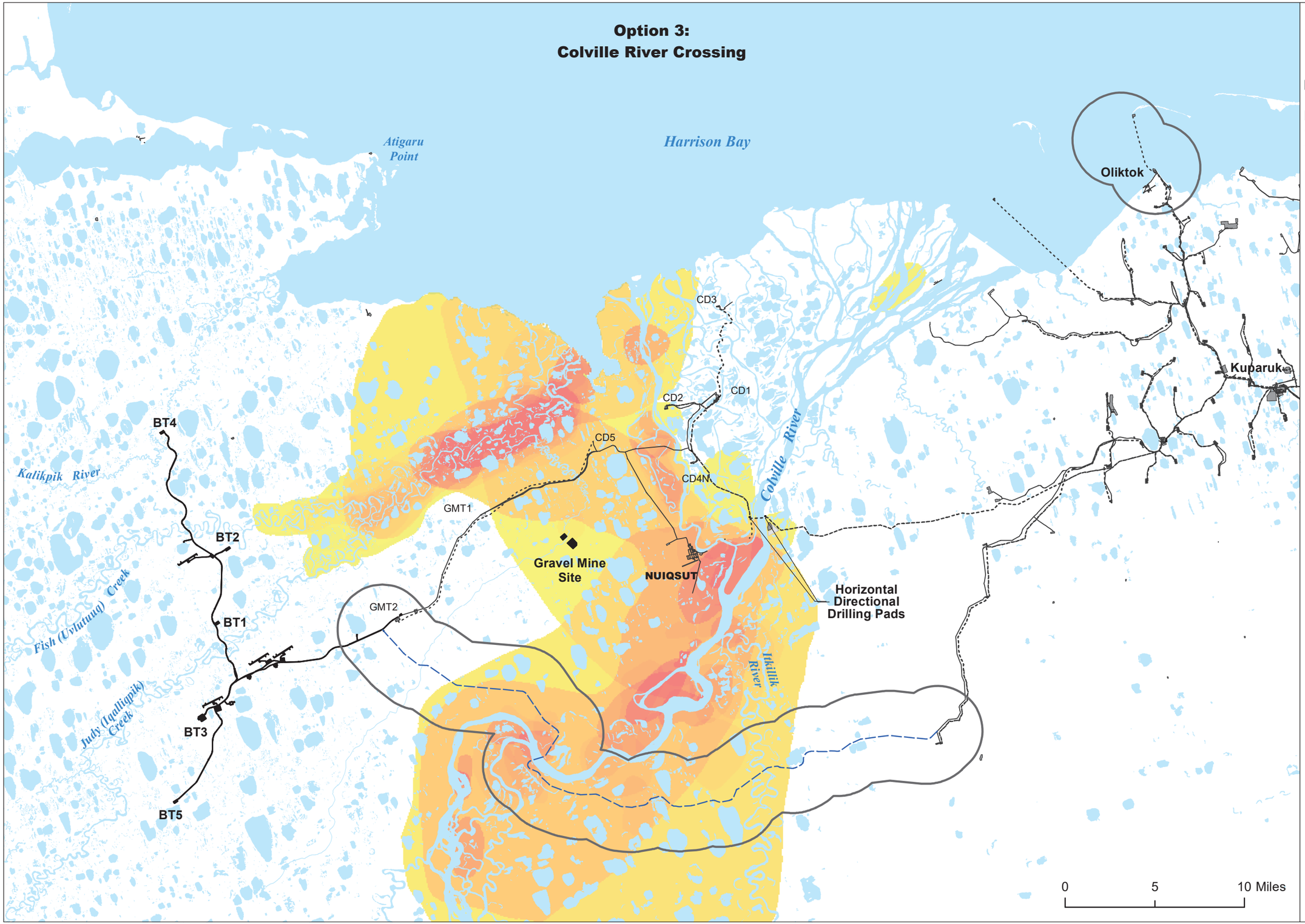
Map prepared by
Stephen R. Braund & Associates

Source
a. SRB&A 2010a

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.16.4

Option 3:
Colville River Crossing



Willow Proposed Development Features

Subsistence Data

- High / Low — Overlapping Subsistence Use Areas Geese, 1995-2006 [a]
- Module Transport Analysis Area
- Ice Road
- Gravel Footprint

Other Infrastructure

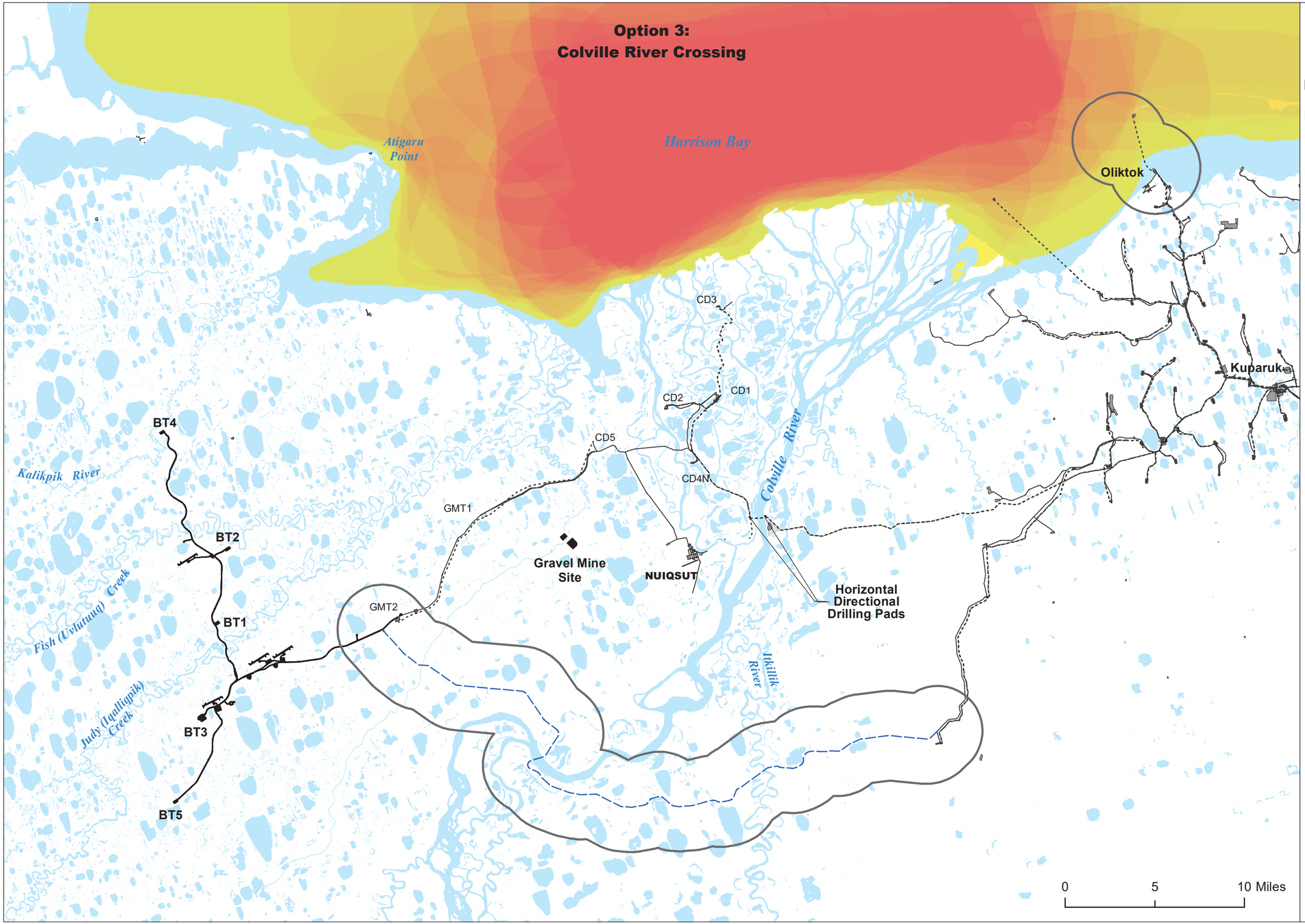
- Existing Road
- Existing Pipeline
- Existing Infrastructure

Map prepared by
Stephen R. Braund & Associates

Source
a. SRB&A 2010a

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.16.5



Willow Proposed Development Features

Subsistence Data

- High / Low — Overlapping Subsistence Use Areas Seal, 1995-2006 [a]
- Module Transport Analysis Area
- Ice Road
- Gravel Footprint

Other Infrastructure

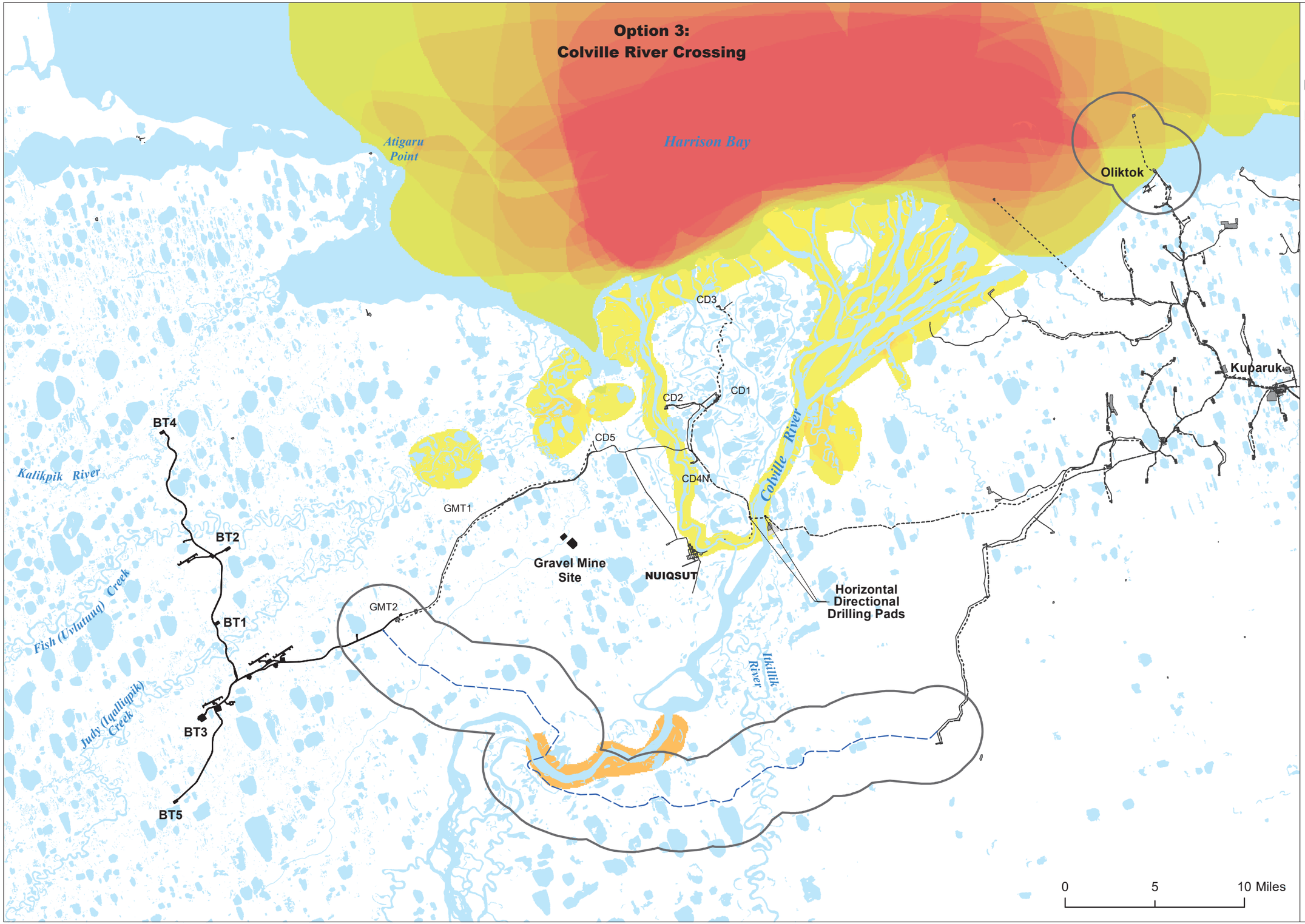
- Existing Road
- Existing Pipeline
- Existing Infrastructure

Map prepared by
Stephen R. Braund & Associates

Source
a. SRB&A 2010a

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.16.6



Willow Proposed Development Features

Subsistence Data

- High / Low — Overlapping Subsistence Use Areas Eider, 1995-2006 [a]
- Module Transport Analysis Area
- Ice Road
- Gravel Footprint

Other Infrastructure

- Existing Road
- Existing Pipeline
- Existing Infrastructure

Map prepared by
Stephen R. Braund & Associates

Source
a. SRB&A 2010a

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.16.7

Option 3:
Colville River Crossing

Harrison Bay
Atigaru Point
Oliktok
Kuparuk
CD3
CD2
CD1
CD5
CD4N
BT4
BT2
BT1
BT3
BT5
GMT1
GMT2
Gravel Mine Site
NUIQSUT
Horizontal Directional Drilling Pads
Kalikpik River
Fish (Uvlutuuq) Creek
Judy (Iqalliqpik) Creek
Colville River
Ikkillik River
0
5
10 Miles

Willow Proposed Development Features
- Fish, 1995-2006 [a]
- Module Transport Analysis Area
- Ice Road
- Gravel Footprint

Other Infrastructure
- Existing Road
- Existing Pipeline
- Existing Infrastructure

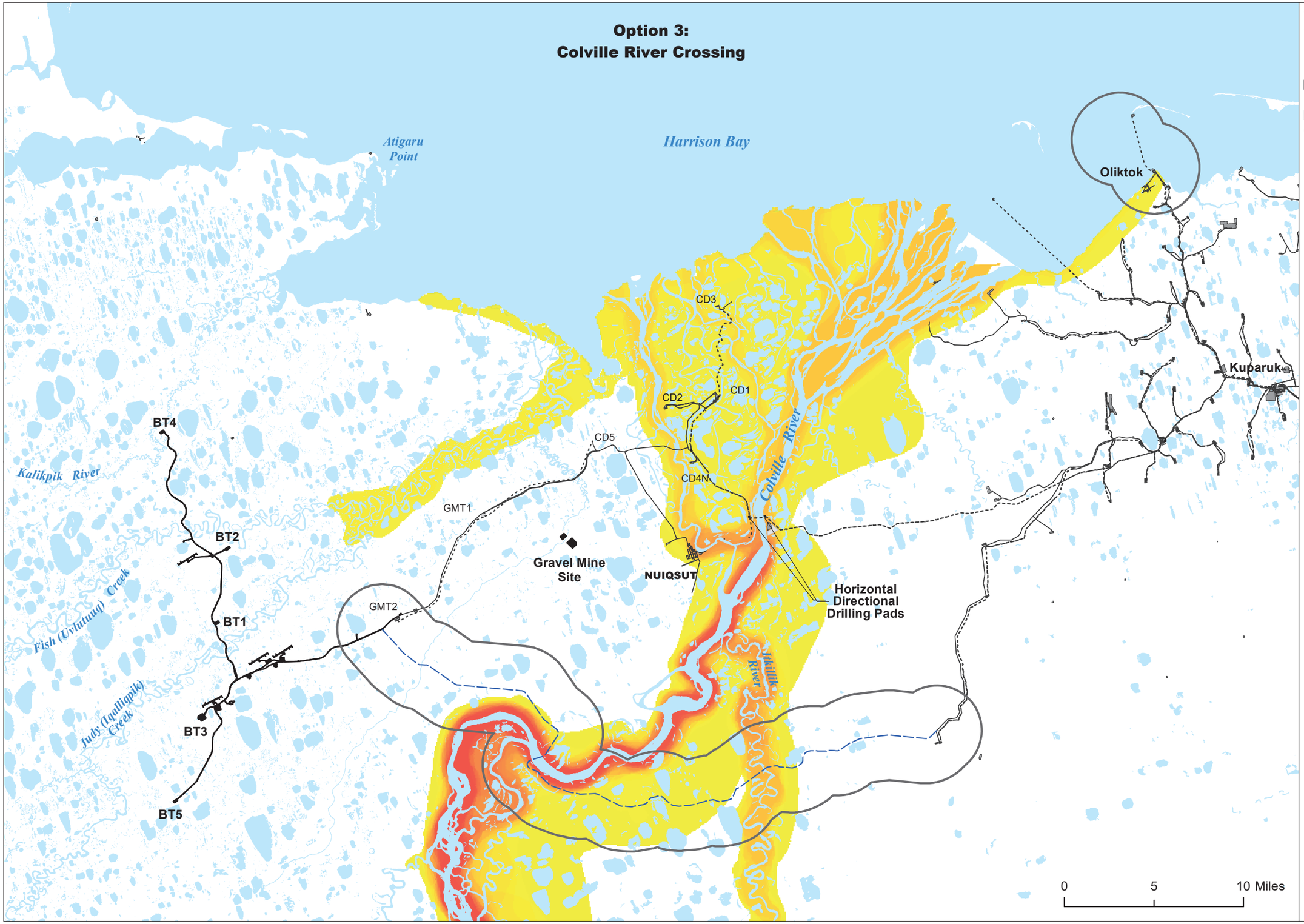
Map prepared by
Stephen R. Braund & Associates

Source
a. SRB&A 2010a

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.16.8

Option 3:
Colville River Crossing



Willow Proposed Development Features

Subsistence Data

- High / Low — Overlapping Subsistence Use Areas Moose, 1995-2006 [a]
- Module Transport Analysis Area
- Ice Road
- Gravel Footprint

Other Infrastructure

- Existing Road
- Existing Pipeline
- Existing Infrastructure

Map prepared by
Stephen R. Braund & Associates

Source
a. SRB&A 2010a

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.16.9

Option 3:
Colville River Crossing

Atigaru Point
Harrison Bay
Oliktok
Kuparuk
CD3
CD2
CD1
CD5
CD4N
Colville River
BT4
Kalikpik River
GMT1
BT2
Gravel Mine Site
NUIQSUT
Horizontal Directional Drilling Pads
Fish (Uvlutuuq) Creek
GMT2
BT1
Itkillik River
Judy (Iqalliqpik) Creek
BT3
BT5
0
5
10 Miles

Willow Proposed Development Features

Subsistence Data

High / Low — Overlapping Subsistence Use Areas All Resources, 1997-2006 [a]

Module Transport Analysis Area

Ice Road

Gravel Footprint

Other Infrastructure

Existing Road

Existing Pipeline

Existing Infrastructure

Map prepared by
Stephen R. Braund & Associates

Source
a. SRB&A 2010a

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.16.10

Option 3:
Colville River Crossing

Atigaru Point
Harrison Bay
Oliktok
Kuparuk
CD3
CD2
CD1
CD5
CD4N
Colville River
BT4
Kalikpik River
BT2
GMT1
Gravel Mine Site
NUIQSUT
Horizontal Directional Drilling Pads
Fish (Uvlutuuq) Creek
GMT2
BT1
Itkillik River
Judy (Iqalliqpik) Creek
BT3
BT5
0
5
10 Miles

Willow Proposed Development Features

Subsistence Data

- High / Low — Overlapping Subsistence Use Areas Caribou, 1997-2006 [a]
- Module Transport Analysis Area
- Ice Road
- Gravel Footprint

Other Infrastructure

- Existing Road
- Existing Pipeline
- Existing Infrastructure

Map prepared by
Stephen R. Braund & Associates

Source
a. SRB&A 2010a

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.16.11

Option 3: Colville River Crossing

Atigaru Point
Harrison Bay
Oliktok
Kuparuk
CD3
CD2
CD1
CD5
CD4N
Colville River
BT4
Kalikpik River
BT2
BT1
BT3
BT5
Fish (Uvlutuuq) Creek
Judy (Iqalliqpik) Creek
GMT1
GMT2
Gravel Mine Site
NUIQSUT
Horizontal Directional Drilling Pads
Itkillik River
0
5
10 Miles

Willow Proposed Development Features

Subsistence Data

- High / Low — Overlapping Subsistence Use Areas Wolf and Wolverine, 1997-2006 [a]
- Module Transport Analysis Area
- Ice Road
- Gravel Footprint

Other Infrastructure

- Existing Road
- Existing Pipeline
- Existing Infrastructure

Map prepared by
Stephen R. Braund & Associates

Source
a. SRB&A 2010a

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.16.12

Option 3:
Colville River Crossing

Harrison Bay
Atigaru Point
Oliktok
Kuparuk
CD3
CD2
CD1
CD5
CD4N
Colville River
GMT1
GMT2
BT4
BT2
BT1
BT3
BT5
Kalikpik River
Fish (Uvlutuuq) Creek
Judy (Iqalliqpik) Creek
Gravel Mine Site
NUIQSUT
Horizontal Directional Drilling Pads
Itkillik River
0
5
10 Miles

Willow Proposed Development Features

Subsistence Data

- High / Low — Overlapping Subsistence Use Areas Moose, 1997-2006 [a]
- Module Transport Analysis Area
- Ice Road
- Gravel Footprint

Other Infrastructure

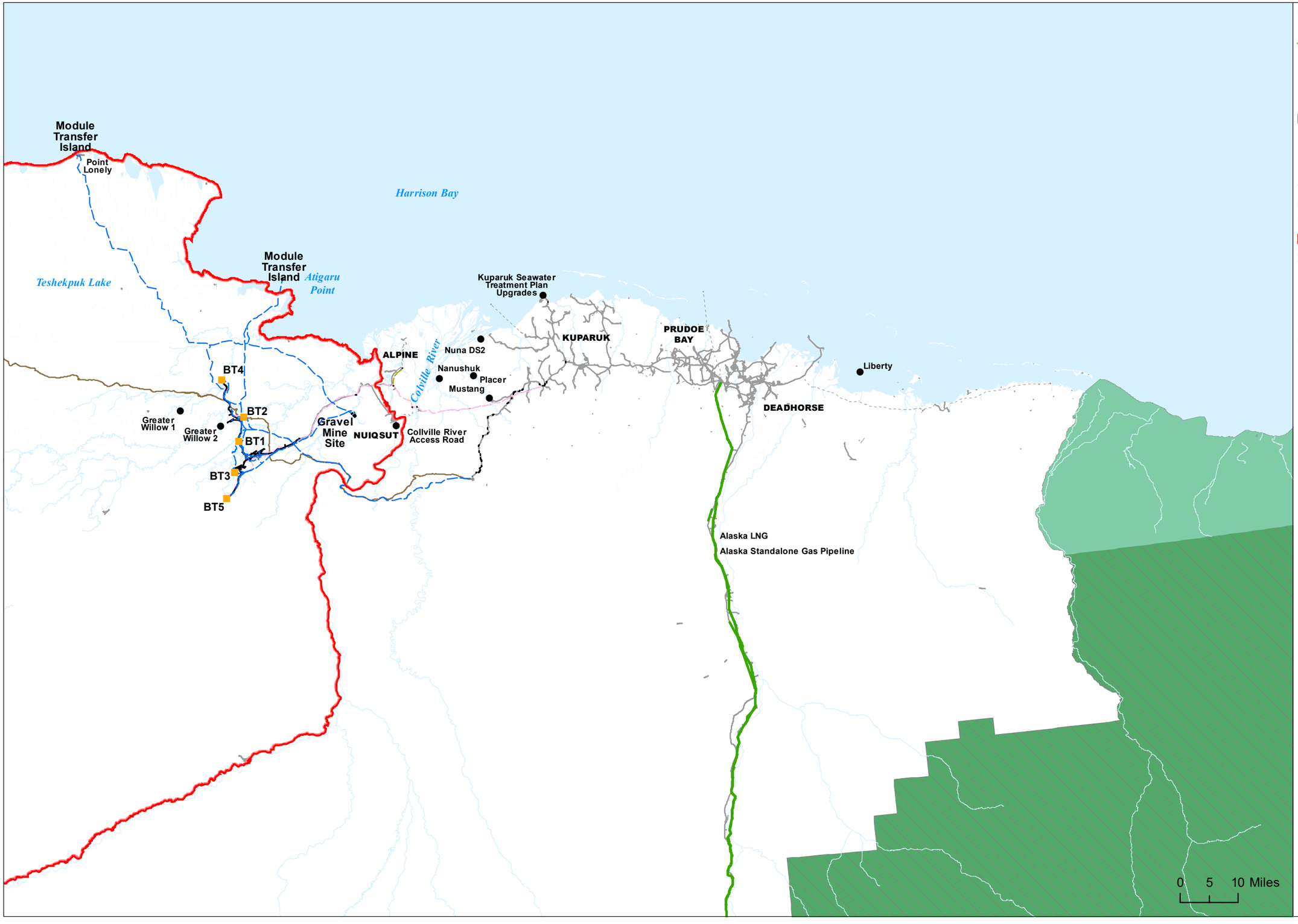
- Existing Road
- Existing Pipeline
- Existing Infrastructure

Map prepared by
Stephen R. Braund & Associates

Source
a. SRB&A 2010a

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.16.13



Reasonably Foreseeable Future Action
- Projects
- Linear Projects

Willow Proposed Development Features
- Drill Site (Not to Scale)
- New Pipeline Existing VSM
- New Pipeline New VSM
- Gravel Footprint

Other Infrastructure
- Existing Road
- Existing Pipeline
- Community Winter Access Trail Project
- Existing Infrastructure

Land Designation
- National Petroleum Reserve in Alaska
- Arctic National Wildlife Refuge
- 1002 Area Coastal Plain Arctic National Wildlife Refuge

Projects Not Shown:
Miscellaneous Sesimic Exploration
Arctic Strategic Transportation and Resources (ASTAR)
NPR-A Integrated Activity Plan Revisions

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 3.19.1